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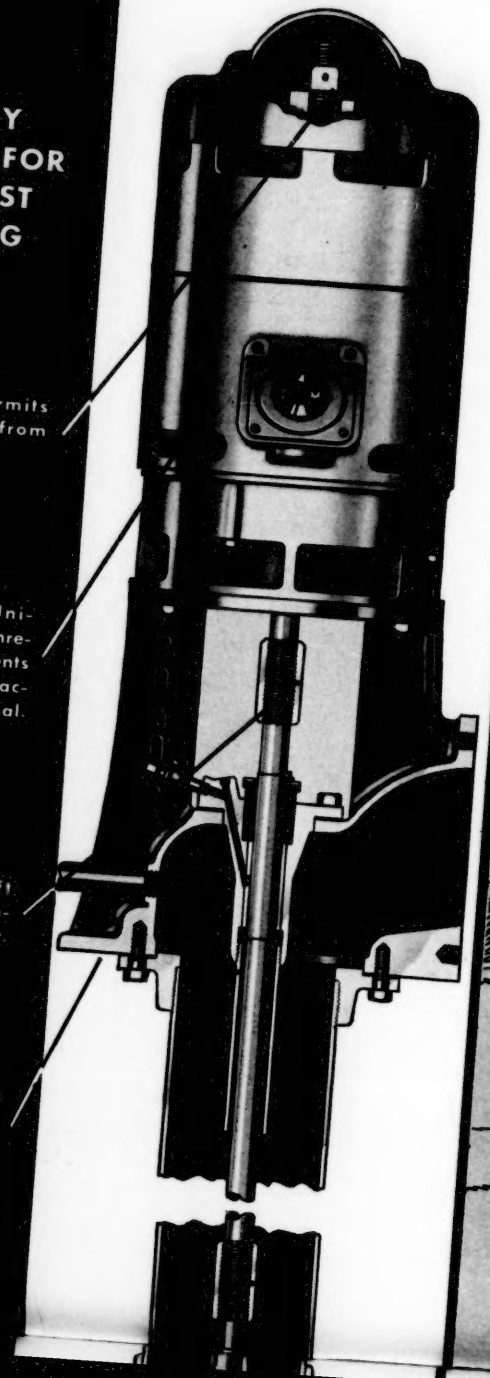

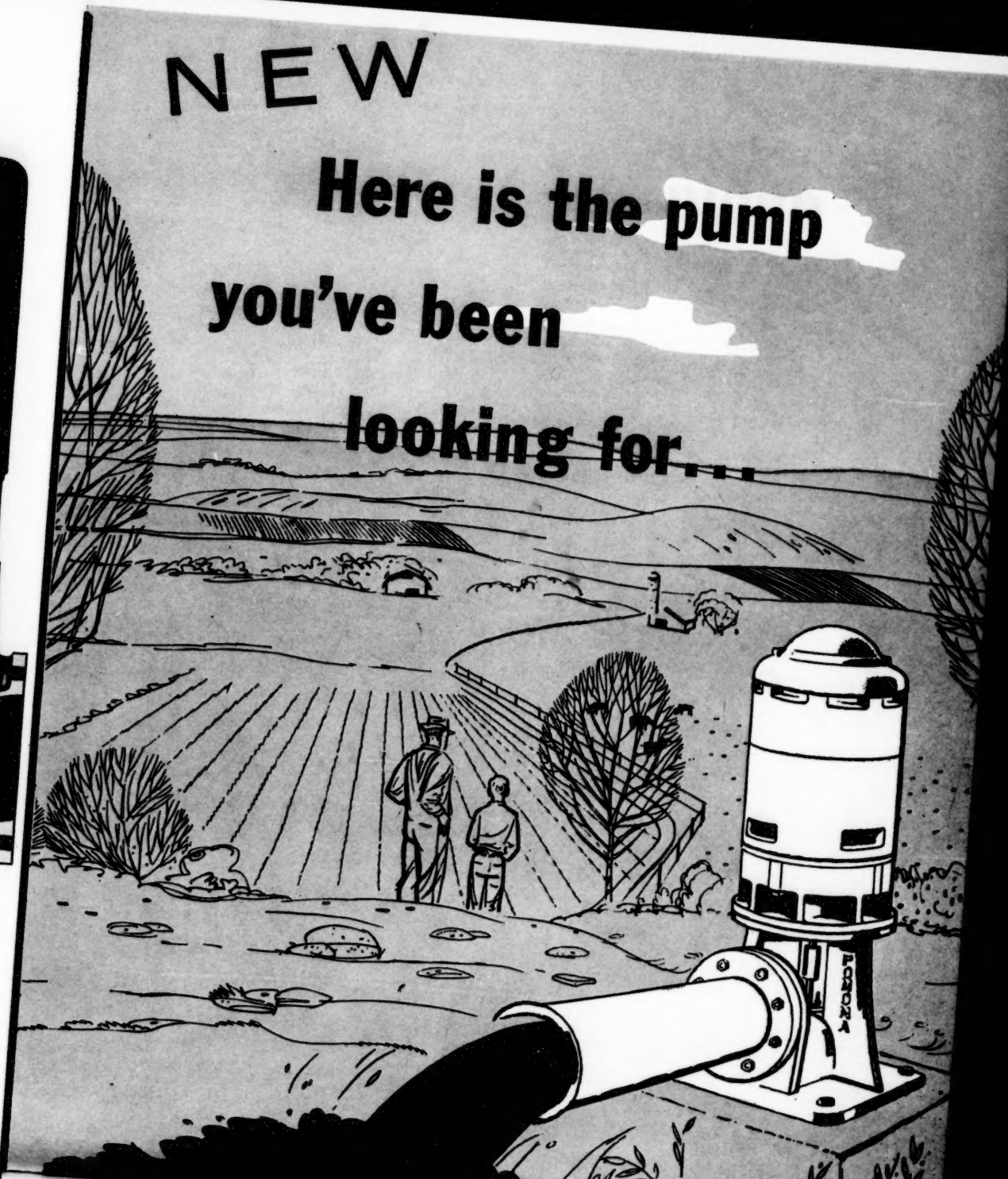

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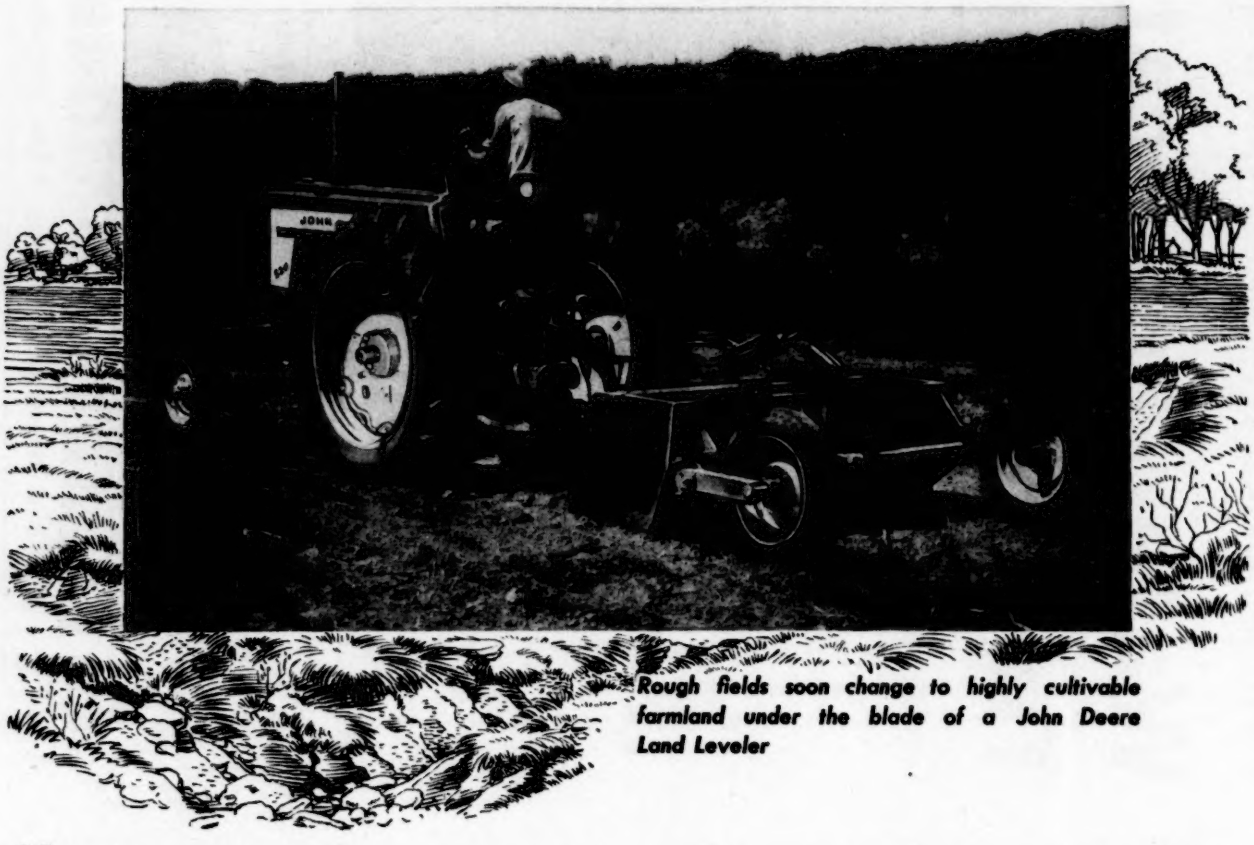

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Journal of SOIL AND WATER CONSERVATION

VOLUME 12
NUMBER 4

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Cover: Tobacco on a contour strip at harvest time. High quality leaf tobacco being inspected as photo was taken on this farm in Lancaster county, Pennsylvania.—*SCS photo*

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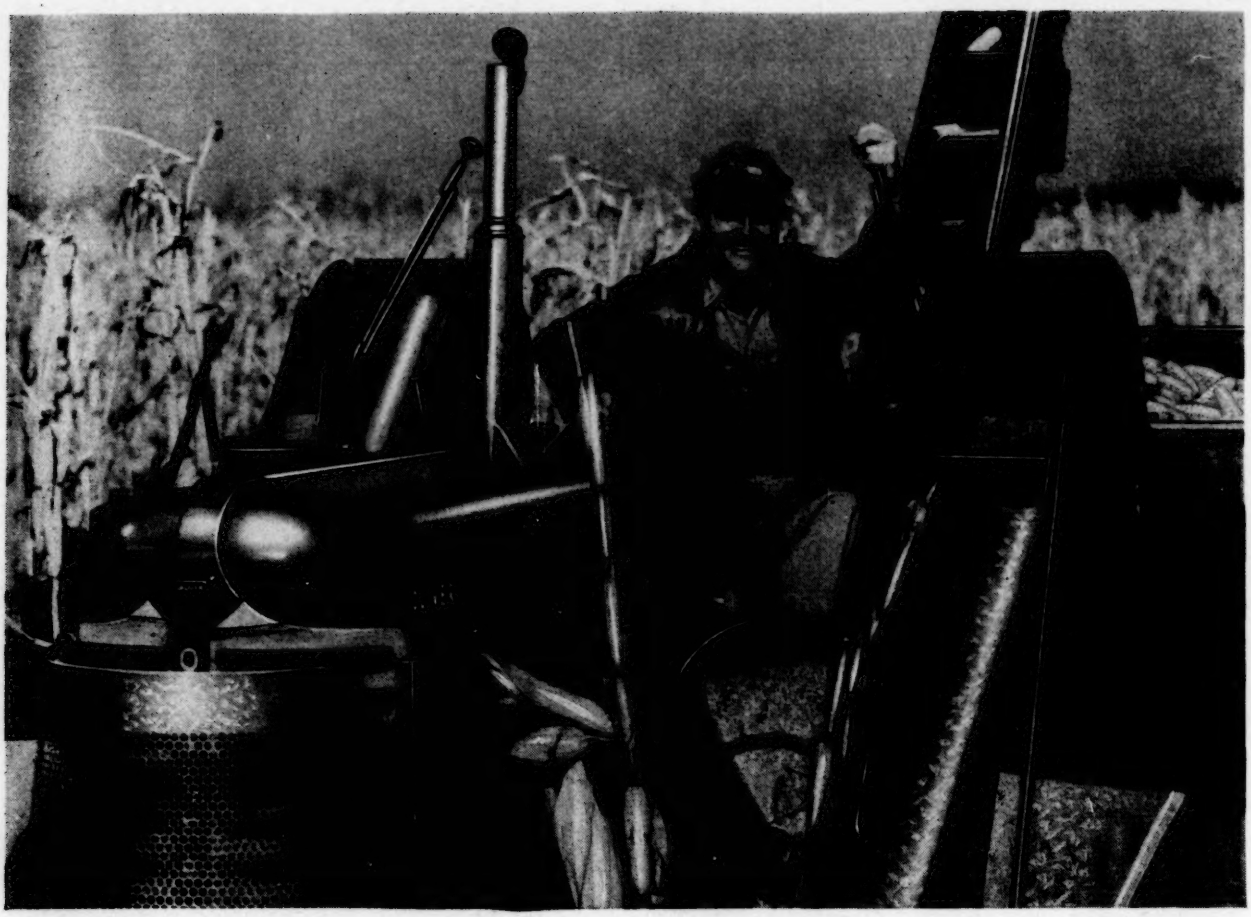

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CONSERVATION—Can It Be a Career?

—ROGER D. HALE

As the concept of conservation broadens to include more and more areas of knowledge, an increasing number of jobs are opening up for people with university training in the field of natural resources. There can be no doubt that such training, at both the undergraduate and the graduate level, serves a valuable and necessary purpose. But does it make sense to speak of conservation as a profession, and of the holders of these jobs as people with careers in conservation? This question may seem academic, but its answer is of basic importance in designing programs of conservation training, in determining who shall receive this training, and in deciding on the role to be played by the "Generalist" in conservation.

Roger D. Hale

TO ANSWER the question intelligently, we must start by defining our terms. Conservation means many things to many people. On the one hand, it deals with nature—with the physical resources of the earth itself, and the biological and mineral resources it is capable of producing. On the other hand, it deals with people, and all the demands of their evolving civilization. *The goal of conservation is to reconcile man's needs with what the earth can supply, not just for today or tomorrow, but for as long as the earth is man's home.*

Now this is a very broad objective, demanding much thought, knowledge, and action for its realization. Today, all the subjects which are concerned with a technical knowledge of some aspect of our physical, biological, or chemical environment—biology, botany, geology, geography, ecology, and many others—are being drawn on for contributions to the theory and practice of conservation, in addition to such traditional subjects as forestry, wildlife management, soil conservation, and agriculture. In the popular mind, all these disciplines are lumped together into one vague concept, loosely referred to as conservation—a concept that you don't have to be too clear about, just as long as you are for it.

Total Conservation Picture

It is true, of course, that each of these areas of knowledge is a part of the total conservation picture, insofar as it helps us to understand and manage the physical environment which sustains our life and our way of living. But just as a drop of water is part of the ocean but not the ocean itself, each area is part of the concept of conservation but is not identical with that concept. In a certain sense, a career in any one of these disciplines is a career in conservation.

But we must keep in mind that a graduate of a School of Business Administration applies for a job not as a "business administrator," but in a specific field in which he has acquired knowledge and skill; in the same way a resource student seeks employment in accordance with his specialized training, rather than as a "conservation-

Conservation involves many subject matter fields, each with its specialists. Big question—Choose administrators from specialists or develop a special course of study?

Roger D. Hale is director of studies in the field of graduate resource training for The Conservation Foundation, New York, New York.

In many conservation careers the ability to work well with people is as important as detailed knowledge of many subject matter fields. In fact, conservation offers a place for the highly technical specialist and the "generalist" who works more with human resources.

ist." Conservation training cuts deeply across many disciplines and areas of activity, but it is in the disciplines and areas themselves that careers lie.

Careers in the field of resource management are likely to fall into two general categories, which overlap to some extent. The first category is composed of the specialists in one particular resource, such as forestry, agriculture, or wildlife management. For these specialists, conservation training is a means of broadening their background in the whole field of resources and acquiring a knowledge of the interrelationships of resources, thus helping them to work more effectively in their own fields. The second category is composed of those members of such professions as law, economics, engineering, planning, and teaching who are specializing in the natural-resource aspects of their profession.

As an example of the first type of career, take forestry. In addition to a thorough grounding in the ever-narrower technical disciplines, into which his subject is divided, the forester needs to have a broad knowledge of the relationship of the forest to all the environmental factors existing in his locale. For instance, he must be aware of the relationship of the timberland he is managing to the entire watershed in which it is situated; he must understand the ecological importance of the forests as a wildlife habitat; and he must be familiar with the broad concept of multiple use, which means he must also know something about recreational opportunities.

Conservationists Work with People

In addition, he must be able to communicate his knowledge and ideas both to the head office and to the people in his community. As one forester aptly put it, "I find myself dealing more with people than with trees."

(In emphasizing this need for a broad approach, I do not mean to minimize in the slightest the narrower technical specializations of forestry, which are also urgently needed, but only to point out the need for a balanced approach.)

As an example of the second type of career, take the law. A student in law school soon comes to realize that it is desirable to specialize in one aspect of the legal profession. He may become a criminal lawyer, a probate lawyer, a corporation lawyer, or a specialist in one of the many other fields. In the same way, he may decide to be a "resource lawyer" and plan his training in such a way as to specialize in water law, land use, zoning and so forth.

Planning Requires Wide Knowledge

Planning is another recognized profession in which there is a need for specialists in resources. A new area of the profession is growing up which is concerned with what is probably our greatest resource—land, not as a biological resource only, but as space in which to carry on the many activities of our evolving and expanding civilization. It is hard to imagine how a planner can make an intelligent choice between the alternative uses of land without a basic knowledge of the principles of land and water management and the natural forces and laws governing them. This whole area includes not only such fields as regional planning, but also other fields that are essentially branches of planning, such as are a development and watershed management.

From these examples it seems clear that men trained in conservation are likely to have careers either in a specialized resource field in which they have received intensive technical training, or as resource specialists in one of the recognized professions.

But conservation is more than the sum of its parts, and a man who can be truly said to have a career in conservation must be an expert in something more than just a

combination of the separate technical specialties. Of course, no one person can master all the technical knowledge of the various special fields, although the "Generalist," or "Resource Manager," must have a practical working knowledge of them all.

What the generalist does have—or should have—is an understanding of the interrelationships of the various resources and of how the whole resource picture relates to man's physical, economic, political and cultural requirements, and the ability to make value judgments on the basis of his knowledge. Furthermore, he must be able to communicate his knowledge and decisions to specialists and to the public through the spoken and written word. If anyone could be said to have a career in conservation, it would be the generalist. Can we say, then, that being a generalist is a profession?

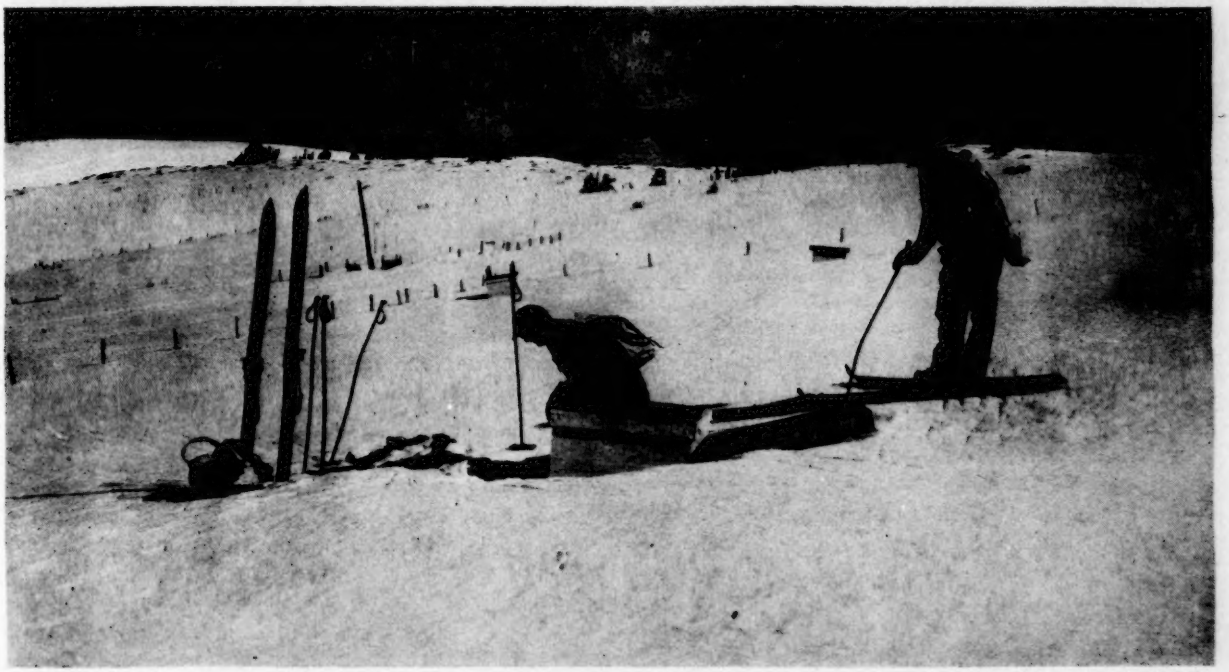
This question was thoroughly discussed last year at a conference on graduate training in resource management, sponsored by The Conservation Foundation, held at the University of Michigan's School of Natural Resources in Ann Arbor. The feeling there was that, although the generalist has a definite contribution to make in the intelligent use and management of our resources, his approach is so broad and cuts across so many disciplines that his work can hardly be called a profession in itself. If the point of view of the generalist is considered valuable for conservationists today, it can best be attained not by training professional generalists, but by giving broad and general conservation training to specialists in one particular resource and to those who will specialize in resource problems in the recognized professions.

It was brought out at the conference that the reason there is no general profession of conservation may lie in the historical development of the subject, which was opposite to that of most disciplines. In such professions as medicine, law, engineering, or teaching, the generalist preceded the specialist, establishing a foundation for the profession, upon which its specialties were built. In conservation it didn't happen that way. The specialities developed first, as the need for them was recognized: forestry, soil conservation, water management, etc., all grew up as separate fields, which later broke up into narrower fields of specialization as technical knowledge increased. These specialties are already well-established professions and will undoubtedly remain so. The last field of conservation to develop was the over-all one of the generalist, so that, in effect, instead of serving as a foundation for the various resource technical professions, it has become a roof over them all.

Training in Conservation

This view of the position of the generalist helps to place in its proper perspective the whole subject of university training in conservation, and should contribute toward our approach to resource education and the development of careers in resource management. We see now that the best answer to the question posed in the beginning of this article is perhaps that although conservation itself is not a career, general training in conservation is a necessary background for effective work in any job dealing with natural resources.

Observer entering manway to soil moisture sampling pit at Alpine, Utah. This represents but one of the specialized fields of conservation. Forest service photo.



Mapping Soils and Vegetation by Helicopter

ROBERT C. MALMGREN

When special problems arise as obstacles in the path of conservation, count on dedicated conservationists to use their ingenuity and come up with a practical solution. In this article the author tells of unusual problems encountered in mapping the soils and vegetation on the Island of Hawaii. Then he describes the use of a Marine Corps helicopter which provided the answer.

MAPPING of soils and vegetation on the island of Hawaii, youngest island in the Hawaiian group, presents problems that are not commonly found elsewhere. Recent geologic activity, mainly volcanic eruption, some of which is still taking place today, is largely responsible for the diverse land conditions on this island. The lack of accessibility to the land to be surveyed has been a handicap, particularly when such lands are surrounded by very rough lava material.

This island, largest of the Hawaiian Archipelago, is not unlike many other sub-tropical islands in climate and vegetation. However, the main factor which sets it apart from the others is its relatively recent origin. This "newness" accounts for the vast acreage of land comprised of lava flows, some of which are so recent that little or no weathering has occurred.

Two Types of Lava

Two general types of lava material may be liberated from the volcanoes. The first and the most dominant is aa,[1] made up of aggregates varying in size from pea gravel to clinkers measuring two to three feet in diameter. This material has a very rough, spiny surface with a massive interior. The second type, pahoehoe,[2] a more truly consolidated bedrock, is characterized by smooth, ropy or billowy surfaces.

With little appreciable weathering having taken place on many of these flows, their present value for agriculture is determined upon two factors: (1) the amount of ash which was deposited on these flows, and (2) the climatic zone in which they are located. On aa flows, the ash deposits may be sparse, but well distributed through a depth of two or three feet. The pahoehoe flows lose very little of this ash deposit due to the small fractures on its surface.

The area in which we were to survey consisted of approximately 115,000 acres. Interspersed in this broad expanse of otherwise worthless lava were kipukas[3] which are "island-like areas of older land ranging in size from a few square feet to several square miles."[4] These kipukas support vegetation of various types, and are thus in contrast to the barren youthful lava surrounding them. Their mode of origin is believed to be due to either topographic irregularities or the viscosity of the lava. While most kipukas are lower than the surrounding lava, a few exist that are higher than the surrounding material.

These kipuka sites in the location of this survey are too stony for cultivation but they represent a grazing potential. Therefore, an inventory of all such areas is necessary information for the ranch planner. Frequently, the surrounding lava is too sharp and fragmental to permit travel by livestock into the kipuka. When a kipuka is of sufficient value, the rancher bulldozes a road into the site and makes it accessible to livestock.

In attempts to obtain the information from such sites, two problems arose. First was the time element to get from site to site. Secondly, traveling across bare aa on foot was not only slow, but dangerous. Both of these factors were definite handicaps. The obvious answer was aerial mapping.

A Marine Corps' helicopter was made available to us so we would have an opportunity to evaluate this method of mapping. The helicopter was capable of seating six men, in addition to the pilot and co-pilot.

Survey Preparations

Preparations for the survey had to be as exacting as possible to avoid loss of position and consequent loss of time while in the air. Four or more contact prints (approximately two inches per mile) were attached to a cardboard backing in order to prevent handling so many individual prints. Match lines were put on each aerial photo so that each photo covered a particular area and met the adjoining photo along a given line. Flights were arranged to parallel the coast as a convenience in orientation for both the pilot and the person doing the mapping. The contact prints used measure approximately 10 inches

[1] *aa—pronounced* ä'ä'
[2] *pahoehoe—pronounced* pä·hō'ā·hō'ā

Robert C. Malmgren is work unit conservationist, SCS, Hilo, Hawaii.

[3] *kipuka—pronounced* key-poó-ka
[4] *Stearns, H. T. and MacDonald, G. A. "Geology and Ground Water Resources of the Island of Hawaii."*

Center area is a vegetated "island" or kipuka surrounded by dark, rough, sharp aa lava. This kipuka, grazed only by goats, is potential grazing for other livestock.

square and from four to six of these prints in one flight line was considered optimum for ease in handling.

It was found that two men constitute the best size of mapping party when in the air. The man with the aerial photos sat in the co-pilot's position and made his observations for mapping from there. Radio contact between the mapper and pilot is desirable so as to direct the pilot to the particular area needing study. This may be a request for circling an area, hovering or landing for an on-the-ground inspection.

The second man in the party takes his position in the "well" (lower hind portion of the "copter" used for passengers and equipment). The duty of this man is to take notes on vegetation and soils as a supplement to the mapper's observations. In addition, this man will do the ground checking when necessary, and take the necessary pictures for the records of the survey. This information can be passed from the "well" to the mapper by radio, or held as a summary at the end of the flight.

Flying Low

The average speed of the "copter" while mapping was 20 to 35 knots per hour (23 to 40 miles per hour). Except when we flew over land with trees, we flew at about 50 feet above the ground. In areas where we encountered trees, it was best to stay about 25 feet above the tree tops.

Azonal soils, particularly the Lithosols, were the dominant soils surveyed. Familiarity with the soils made it possible to symbolize many of them while in flight. The same was true of many of the vegetative write-ups. Actual landings were made at seven different locations, primarily at the beginning of the flight as a means of confirming our aerial aspect. With more experience in the air, we found that we could decrease the number of stops and hovers. In all, we hovered a total of eleven times to have a closer check. This was done at from three to five feet above the ground. While a rope ladder can be used in getting to the ground during hovering when the terrain is too rugged for landing sites, we were able to choose satisfactory landing sites when it was necessary to set down for observations.

In addition to the rough lava hindering survey operations on foot, a considerable acreage (3,000-4,000 acres) of dense forest would have offered much difficulty in sur-

The helicopter proved a good answer to mapping problems on the Island of Hawaii. But plans had to be laid in minute detail before each survey trip.

veying. This moderate to very dense site of Ohia trees (*Metrosideros collina*), Koa trees (*Acacia koa*), and scattered fern understory was easily identified after hovering three or four times in the area.

With a total time of four hours and ten minutes of actual flying time, we surveyed 111,354 acres, which figures out to 445 acres per minute. It would have involved at least 60 man-days to survey this same acreage on foot. It is doubtful if such an area could be covered on foot without physical injury.

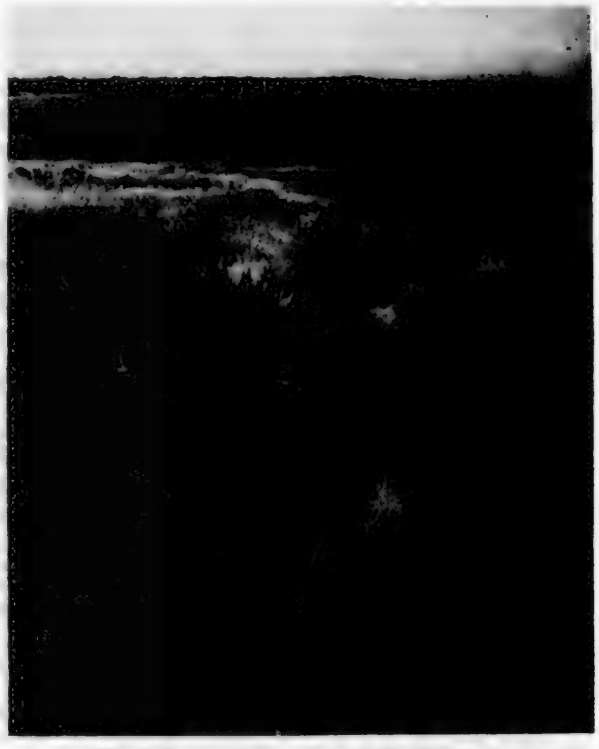
The advantages of mapping by helicopter were:

1. Speed.
2. Economy (with 4 1/6 hours of flying time and assuming a charge of $100 per hour for rental of a helicopter the cost of the plane would be $416.00. Two men at $2.91 per hour for this same period would be $24.16 for a total of $440.26.)

   If this same area was attempted to be mapped on foot, it would probably take two man-months due to difficulty in walking and location on the aerials. With an average salary of $500 per month, this would cost about $1,000. This does not take into consideration the loss of time and money resulting from possible injury while walking in such an area.
3. Able to survey land that would otherwise be difficult to survey.
4. Light to moderate rains do not hamper such observations. Maps are protected at all times in the "copter" and the actual checking time needed on the ground is very short.

The main disadvantage was:

1. Not adapted to lands with dense, lush vegetation where these sites represent deep soils (these areas must be mapped on foot to obtain necessary details).



The helicopter hovered over this kipuka for a vegetation write-up. Shrubs shown are lantana (*Lantana camara*). Dominant grass is guinea (*Panicum maximum*).

The author wishes to acknowledge the splendid cooperation of Major David Riley, Captain Charles E. Greene and Corporal Robert Hagstrom of the Marine Corps. Carl L. Sundquist, Work Unit Conservationist of the Kansas S.C.D., provided excellent assistance on the vegetative write-ups.

We believe this survey proved the value of aerial mapping under such circumstances.

Dark area is sharp aa lava forming a barrier to livestock—except goats. Lighter areas are vegetation suitable for grazing.

This photo shows a newly-formed area of kipukas. The "islands" of cane land are surrounded by sharp aa lava. The cone which produced the lava is shown in the background. Eruption was in March, 1955.

Some Plant Materials and Improved Techniques Used in Soil and Water Conservation in the Great Plains

H. W. COOPER

Conservation problems and different land uses in the Great Plains require the use of a great variety of plant materials for many purposes. This paper deals primarily with plant materials and techniques used for establishing permanent herbaceous cover on some of the major problem areas.

SOIL CONSERVATION Service technicians assisting with the development of farm and ranch conservation plans or plans of watershed treatment in the Great Plains frequently encounter problems requiring the use of plant materials and techniques not in common use.

Most of the readily available materials and commonly used techniques were developed for use on cropland in humid or sub-humid areas. Many are not adaptable to arid or semi-arid lands. The extremes encountered in both climate and soil place rather exacting demands on plant materials if effective, long-lasting conservation is to result.

The solution to such problems usually comes by the adaptation and use of known plant materials and techniques. Many problems relating to the use of plant materials in conservation may be solved by adapting data from basic research findings to the conservation needs of an area. Others may be solved by extending successful experiences of technicians, farmers and ranchers. A considerable part of the conservation work with plant materials in the Great Plains is based upon years of field observation by technicians throughout the area.

Use Principles of Plant Ecology

Solutions to many of the problems involving the use of adapted plant materials for conservation of soil and water in the 10 Great Plains States are still far from realization at this time. But the most successful permanent plantings have been those based upon principles of plant ecology.

Some of the principles, research and observation upon which present recommendations have been based are:

1. *The effectiveness of a plant cover in reducing soil and water losses improves as the composition* trends toward the natural or climax composition of the site. Duley and Domingo (3) reported that even in a dune-sand area the presence of a good stand of native grass had a marked effect on infiltration of water. Warner and Aikman (6) reported the results of intensive field experiments showing that the effect of the plant cover through successive stages of secondary plant succession has even a greater effect in reducing soil loss than in reducing water loss. They further state that "From these results it would seem that any telescoping of stages of the succession, by the introduction of adaptable plants into any stage of the succession, would be effective in soil building and thereby in erosion control."

Sand bluestem from different seed sources. Plants from northern seed matured early with limited forage production. Southern plants grew slower and were leafier. Some failed to produce seed before frost. Seed source: A—Amidon, N. Dak.; B—Mandan, N. Dak.; C—O'Neill, Nebr.; D—Liberal, Kans.; E—Guthrie, Okla; and F—San Antonio, Texas.

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Root plowing brush infested range land near Rankin, Texas. Note grass seeder boxes mounted on back of tractor with exhaust connection to scatter seed behind the plow. SCS photo.

2. *Through the natural law of plant succession, nature can re-establish the climax complex if given* the opportunity (2). In other words, fully adapted climax dominant species can become established and compete successfully with sub-climax species even though the latter currently occupy the site.

3. *Our observations indicate that the area of full adaptation of native ecotypes may be relatively* narrow. When moved too far from the point of origin they apparently cannot maintain themselves in competition with local strains of the same species or with other climax species of the site. When moved outside the area of full adaptation they act much like exotics and for that reason cannot be considered as being permanent.

Observations indicate a strain or ecotype can be moved about 250 to 300 miles north or 100 to 150 miles south of the point of origin to areas of comparable soil and climatic conditions and be expected to give satisfactory performance under natural conditions. Movement east or west under natural conditions may be greater or less, depending on changes in elevation and precipitation. It appears that these distances may be increased if material is moved north to a lower elevation or if material is moved south to a higher elevation. A few species appear to have wider ecological amplitude than others and are not as demanding in site requirements permitting use over a wider range of soil and climatic conditions.

4. *Currently-used exotic species, especially when planted on thin or infertile soil, tend to lose their* conservation effectiveness in a relatively short time unless artificially maintained. Erosion is usually evident, for example, in a pure planting of crested wheatgrass even while the planting is still producing considerable forage. The ground is often bare between plants. This results in puddling and sealing of the soil by raindrops and loss of soil and water.

5. *Research, as reported by Rogler in North Dakota (5) and Kessler in Kansas (4), and observations* in the Great Plains, indicate that where artificial measures such as fertilization are not maintained the native climax dominants not only give better protection against erosion than exotic species but are also the most productive over a period of several years.

Following are some of the plant materials and techniques being recommended for establishment of permanent herbaceous cover on some of the major problem areas:

On a very large part of the Great Plains the native vegetation has been reduced to short grasses, mostly buffalograss and blue grama, by past systems of grazing. Forage production has been reduced and runoff increased. Among the climax dominants, the midgrasses and some tall grasses, have been nearly eliminated. In many instances their restoration by grazing management alone is impractical because of inadequate, natural seed source. Therefore, the Service has developed techniques to reintroduce appropriate climax dominants by seeding.

Shallow Furrows

Most of the land is classed as VI or VII by the Soil Conservation Service. This means seedbed preparation by clean cultivation would be hazardous. In order to give grass seedlings the benefit of reduced competition and some additional soil moisture without incurring the expense or risks of plowing, the plantings are made in shallow furrows. The furrows are about two to three inches deep, nine to ten inches wide, and spaced at about

four-foot intervals on the approximate contour. Climax dominants of the particular site are seeded into the furrow. Furrowing and seeding are done as one operation.

Species seeded in western Kansas are climax species for the various sites as recorded by Albertson and Tomanek (1). For example, sideoats grama, little bluestem, and western wheatgrass are seeded on the hardlands. Switchgrass, sand bluestem, bluestem mixture, and sideoats grama are seeded on the sandy land.

Grazing is deferred until after seed matures on the seeded grasses. Although the past three years have been dry, survival of the seeded species has been very good. There remains only to determine the rate of spread between the furrowed rows, by plant succession, of the seeded species.

The seeder used is an inexpensive modification of a two-row lister planter. Cotton boxes are used to seed chaffy seed and Planet Junior type boxes are used for small clean seed.

Seedings Have Been Successful

P. N. Jensen, Range Conservationist of the Soil Conservation Service, Dodge City, Kansas, has been taking the lead in this work. He has helped Soil Conservation District Cooperators put out a number of plantings in the past three years. Results are very promising. Based upon the apparent success of this method, local Soil Conservation Districts and their cooperators are buying equipment and expanding the treatment.

In the Southwestern Great Plains, particularly on the Rio Grande Plain, brush, as well as shortgrasses, has increased as the result of past grazing practices. The brush consists mostly of various species of Mimosa, Acacia, Celtis, Prosopis, and Condalia.

Where the brush is less than three inches in diameter, good control of non-sprouting species is gained by using heavy knife-equipped, rolling choppers weighing about 2,000 pounds per linear foot of cylinder. The choppers are towed behind large crawler tractors. These are often used on shallow or rocky range sites. The seeding mechanism consists of planter boxes mounted on the tractor arranged so that seed is dropped behind the choppers in shallow trenches left by the knives. The tractor exhaust is used to scatter the seed behind the chopper.

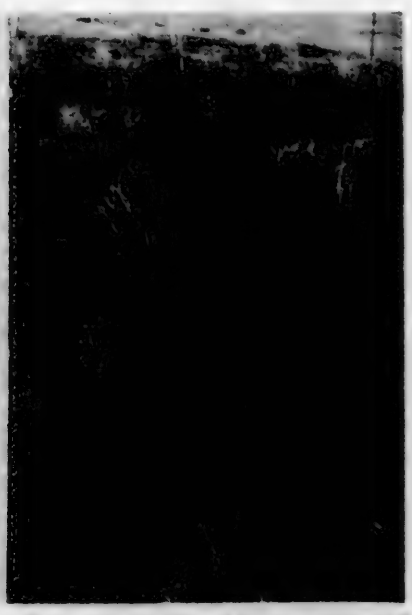
Root Plowing Used

Where the brush is mostly larger than three inches in diameter, or where eradication rather than control is desired, root-plowing is used. The root-plow is simply a heavy blade drawn horizontally under the ground behind a large tractor. The depth of plowing is eight to 12 inches in lighter brush or 12 to 18 inches in larger brush or trees. The seeding mechanism used is essentially the same as used with the chopper. The species seeded have mostly been blue panic and buffelgrass with seed of adapted natives when available. Seeding rates have been one to two pounds of pure live seed of each species per acre.

Deferred Grazing

The range is deferred from grazing for one growing season. Moderate grazing thereafter, with periods of deferment, permits seed to develop on the native climax dominants. The brush is left on the ground surface to

This photograph shows seedlings of climax species emerging after planting in a shallow furrow in blue grama-buffalo grass sod. Furrows were spaced at four-foot intervals and made on the contour. SCS photo.



Note row of blue sideoats grama and western wheatgrass producing seed after furrow seeding in sod on hardland site.

promote infiltration of water and provide some protection to the grass. The vegetation on a properly managed range, when inspected five years after treatment, was found to consist mostly of native climax dominants with limited amounts of new brush.

Big Yield Increase

In the past few years over 300,000 acres of range have been treated in this manner in Soil Conservation Districts in south Texas. Results have been excellent. On treated sites, yields of green forage ran as high as 15,000 pounds per acre, while adjacent untreated areas produced 250 pounds per acre.

There are several million acres of abandoned or marginal cropland in the Great Plains. This land is being seeded back to grass quite rapidly in some areas. For example, grass plantings are averaging about 190,000 acres per year in Oklahoma and about 80,000 a year in Kansas. Most of these plantings are made to seed formerly cultivated land to permanent grass.

How to Re-seed

The technique of reseeding this land is becoming standardized. The most successful procedure is to begin preparing the seedbed a year ahead. The land is prepared and close-drilled to an annual such as sorghum or sudangrass. Perennial grass is then seeded into the protective stubble the following year. This procedure is particularly important in the Southern Great Plains where clean, garden-type seedbeds have frequently resulted in continued erosion and stand failures. A firm seedbed and a protective mulch are essential. The seeding is made with a special double-disc furrow opener grass drill equipped with depth bands that were developed specifically for this type of planting. The drills are available commercially. Many Soil Conservation Districts own drills.

The species planted are locally adapted climax natives whenever possible. In the Southern Plains the native species seeded include bluestems, Indiangrass, switchgrass, and sideoats grama. In the Western Plains blue grama, sideoats grama, and western wheatgrass are seeded on adapted sites. In the Northern Plains the seedings include western wheatgrass and green needlegrass. If the supply of adapted native seed is limited, part of the mixture is made up of exotic species and management is directed toward increasing the natives.

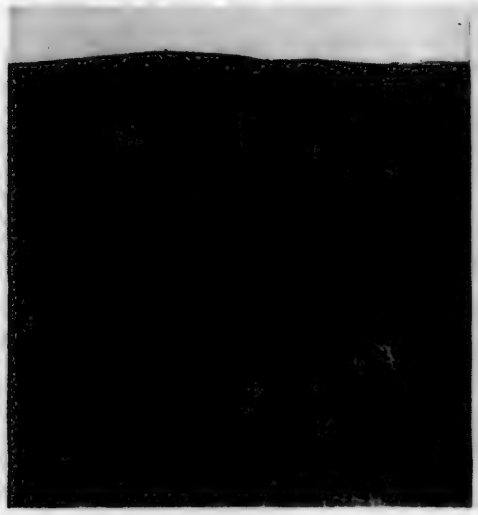
Exotic Species Need Extra Care

Particularly in the range country, exotics are best seeded when there is a need to balance seasonal forage supplies. When exotics are needed, they should be planted on the better land with the understanding that they must ordinarily be fertilized regularly if they are to maintain high production. In the higher rainfall areas of the Southern Plains improved strains of bermudagrass, blue panic, buffelgrass, exotic bluestems, and reseeding legumes are providing abundant forage. In the Northern Plains such cool-season species as smooth brome, intermediate wheatgrass, crested wheatgrass, and various legumes, particularly alfalfa, are used to meet hay and tame pasture needs.

Native Species Most Dependable

The use of terrace systems to help protect cropland and conserve moisture in the Great Plains is a continuing and expanding practice. Most of the terrace systems require a grassed waterway to carry excess water from the system without damage. Here, again, the planting must be of a permanent nature. It is very difficult to reshape

A 16-year-old mixture of crested and western wheatgrasses near Crawford, Nebr. The mixture does better than crested alone.



A 23-year-old stand of crested wheatgrass showing sealed, bare ground between plants. That is common in pure plantings of crested wheatgrass. Mixtures often do better than plantings of a single grass.

Blue panic grass planted in strips on clean tilled cropland to provide protection from wind. The two-row plantings alternate with 40-foot strips (12 rows) of clean tilled land near Ramondville, Texas. SCS photo.

and reseed an eroding waterway with the terrace system emptying into it.

On deep fertile soils where fertilizer is applied regularly, such rhizomatous exotics as smooth brome or bermudagrass give excellent protection except when extremes in climate cause extensive damage to the stand. Most waterways require some shaping which often exposes the less productive sub-soil. Where these conditions occur or where fertilizer is not applied regularly, the exotic species usually fail after a few years. Observations in the Great Plains indicate that the locally adapted native climax dominants give the most dependable protection. Once a stand of natives is established and protected from abuse, it gets better and better as time goes by because the species are naturally dominant on the area. They too, of course, are affected by climatic extremes, but not as greatly as the exotics. The seedbed preparation and seeding equipment recommended is very similar to that used for reseeding abandoned cropland.

Permanent Plant Cover

With additional emphasis being placed on watershed treatment there is an increasing demand for the establishment of a permanent protective plant cover on numerous dams, spillways and other disturbed or eroding areas. The earth fills are constructed of compacted sub-soil or parent material. The cut spillways and other areas of excavation expose raw sub-soil or parent material. Slopes are often relatively steep. Construction work continues throughout most of the year resulting in the completion of structures all through the growing season.

Revegetation of these areas has been quite a challenge. The techniques and plant materials have been modified from place to place as conditions required. When construction material is especially infertile a thin mantle of topsoil (six to eight inches) is spread over the completed structure. This mantle must be tied down quickly or a storm may wash most of it from the compacted subsoil.

Irrigation Often Needed

In the areas of adaptation, smooth brome, KR bluestem, sprigged bermudagrass and a few other exotics give quick and effective cover as long as fertility is maintained. Sprinkler irrigation is often necessary to insure establishment, depending upon the rainfall and time of year the planting is made.

Where an owner does not want to be faced with the task of continual fertilization, adapted native climax species are used to give the protection required. Because of the nature of the site, species which may be subdominant in the climax are included in the original plantings. Even annual weeds are encouraged to help provide a protective mulch and to hasten moderation of environmental extremes.

Apply Mulch After Seeding

Efforts to grow a protective mulch or cover as is done on abandoned fields have been discouraging. Where a protective mulch is necessary, and it usually is, a mulch is applied after seeding. The mulch may consist of native seed-hay, broomcorn stalks, straw, or other material. Between two and three tons per acre are applied. The mulch can be anchored by using a straight disc to punch it into the ground, spraying with asphalt or using special equipment.

Observations indicate that exposures and steepness of slope may be highly significant in stand establishment

and survival. Southern and western exposures seem the most difficult on which to get satisfactory stands established. Seedlings which do quite well on northern or eastern exposures may fail on the southern or western exposures.

Steepness of slope when coupled with exposure may also be limiting. A four-to-one slope with a southern exposure may not be too difficult but a two-to-one slope with a southern exposure seems to be a very difficult site on which to get grass seedlings established.

Many crops, such as vegetables, drybeans, and potatoes, do not provide adequate crop residue to protect the soil from wind erosion during the period between harvest and planting. In an effort to protect land used for such crops, tall-growing perennial grasses are being planted as windbreaks within the field.

The most successful to date have been plantings in south Texas of two rows of blue panic (*Panicum antidotale*) at intervals across the field. The interval between the windbarriers depends on the kind of soil, wind hazard and width of machinery normally used by the operator. Such plantings have not only been effective in stopping wind erosion but have also protected crop seedlings from "sand blast" by strong winds in the spring.

The uses of plant materials for conservation in the Great Plains are many and varied and involve the use of grasses, legumes, trees and shrubs for numerous purposes on cropland, range, woodlands and wildlife habitats. The surface has hardly been scratched as to determining the possible uses of species, strains, or necessary culture. Considerable refinement of present knowledge is needed.

In summary it can be said that observations arising from the use of plant materials for conservation purposes in the Great Plains indicate that the high-producing, improved exotic species and domesticated natives have their greatest value on deep, fertile, arable land where their high potential can be realized through fertilization, crop rotation and reestablishment. Where soils are not arable or, for other reasons, the objective is a permanent protective and productive cover with a minimum of maintenance, locally adapted climax species best fulfill the needs. Where unnatural species are introduced they must be considered temporary and must normally be maintained artificially.

Seedings adapted native grasses into sudan grass stubble on sandy land with a special grass drill in the Wichita Brazos Soil Conservation District, Texas.

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Grass and the Highway

(Excerpts from a paper presented at a recent New England chapter meeting by E. F. Button)

"Grass is a prime item in the development of the highway. It not only improves appearance but plays an important role in reducing and preventing erosion and in bringing about economy of maintenance.

"The great paved area of the modern highway collects many tons of water which, unable to infiltrate into the substrate, must be channeled into extensive drainage systems. This vast volume of water eventually must be emptied into natural drainageways.

"Grassed and vegetated slopes, median strips and bridge approaches decrease the amount of runoff to the paved areas. Well planned and maintained vegetated areas afford the opportunity for water infiltration and accumulation to water reserves. "To give an idea of the amount of materials required to establish grass on a modern four-lane highway, the following estimates are given for a typical mile:

13 acres to be seeded and fertilized
7.5 acres covered with 5,462 cubic yards of topsoil
6 acres mulched
5 tons limestone
1,152 pounds grass seed mixture."

Water and Land Conservation and Use

SENATOR STUART SYMINGTON

Page after page of history points to the necessity of conserving this nation's natural resources. If population trends continue, our present so-called surplus agricultural production is but a temporary abundance. In this article, Senator Stuart Symington proposes a six point program for water conservation that is worth study by all conservationists.

HISTORY shows that every civilization which has risen to world prominence has done so only in areas where the soil was fertile; and where pure water was abundant.

It was not by coincidence that man's first cities were built along the fertile banks of the Tigris-Euphrates River in Mespotamia; and along the Nile River in Egypt. These areas were the "cradles" of early civilization.

It is an historical fact that no nation has long maintained a leading world position after either its soil or water supply became depleted. As illustration, Rome was perhaps the proudest of all ancient empires. But by the second century A.D. that empire had become so impotent agriculturally the historian, Simkovitch, was moved to write:

"Province after province was conquered by Rome to feed the growing proletariat . . . Latium, Compania, Sardinia, Sicily, Spain, Northern Africa, as Roman granaries were successively reduced to exhaustion. Abandoned land in Latium and Campania turned into swamps; Northern Africa into a desert. The forest-clad hills were denuded."

In other words, when the Roman Empire became an agricultural parasite, like all other parasites, it perished when its sources of food became exhausted.

History's greatest lesson may be the fact adequate water and land are prerequisites, not only to improved living standards, but also to national survival.

When the United States was first settled some 350 years ago, timber, water, and rich soil existed in great abundance. But the population grew steadily and the consumption of soil products and water steadily increased; and therefore, shortly after the year 1900 we realized that shortages were possible even in America. As a result, President Theodore Roosevelt initiated the nation's first conservation program.

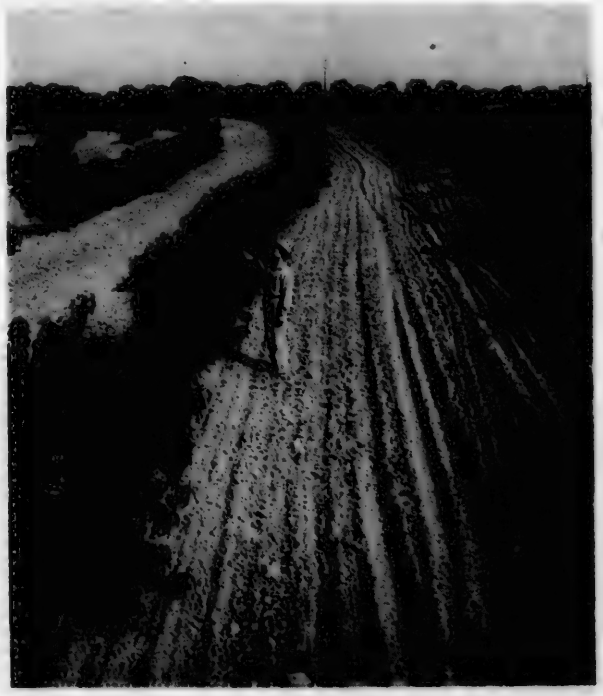
Then came World War I, with its tremendous drain on our productive capacity; and later the gigantic growth in our industrial complex during the 1920's. By the early 1930's the complete exhaustion of our natural land and water resources could be foreseen; and so, under the leadership of another Roosevelt, our government undertook to carry out the greatest reclamation, conservation, and resources development program ever conceived in all history.

Vast tracts of arid desert became areas of fertile productivity. Denuded hills were reforested. Deplenished agricultural plains were first fertilized and then sown in grass and grain. Multiple-purpose reservoirs were constructed.

This was a program to preserve our greatest heritage—the soil and water of America.

With the exception of the air we breathe, water is the

This St. Clair county, Illinois, peach orchard is part of America's great agricultural abundance. But how long does this abundance last with a growing population?



The Honorable Stuart Symington is United States Senator from Missouri. He is a member of the Senate Committee on Agriculture and Forestry.

material most vital to human life. It is the largest single controlling factor in the growth of population, in the growth of industry, and in the growth of agriculture.

Because we of America were particularly blessed with an initial abundance of fresh water, we can only blame ourselves for that lack of foresight which in turn now forces us to face up to this impending water shortage.

As our population increases, we must devote ever more attention to the elimination of water waste through uncontrolled floods, lack of conservation practices, and stream pollution.

Critical Scarcity Is Probable

In all probability, within 20 years water will be the most critical scarcity of all our national resources. According to the Hoover Commission, in 1975 water consumption will be one and one-half times greater than it was in 1950—but in 1950 we were already suffering serious water shortages in many areas: a trend that is increasing each year.

Recently, the Chief of the Fish and Game Division of the Missouri Conservation Commission warned about this problem as follows:

"Approximately three-fourths of the earth's surface is water, one-fourth land. I contend that the Lord made the earth that way because that is the relative importance of the two. Regardless of what anyone may believe, however, the fact remains that life on this earth, in all its forms and facets, has developed and must live accordingly.

"Water is our most important resource. The available supply of fresh, pure water is an absolute deadline beyond which no community, state or nation can ever go. When humanity runs out of clean water everything stops—that is the end of the road for man and all his activities."

The growing domestic, industrial, irrigation and power needs for water make imperative the adoption of a national water policy which will insure the development of our new water supplies.

To that end the following six steps, some now being taken haltingly and some not at all, should be followed resolutely:

1. There should be a coordinated program of flood control, water storage and power development through the construction of multiple purpose reservoirs, wherever feasible, on the water arteries of the nation.

2. There should be a cooperative national and state program for organization and development of local watershed districts to control water runoff at its source. This would conserve and preserve a supply of fresh water on the land where it falls.

3. There should be a strong program of stream pollution control. That control should embody, first,

Efficient use of water in irrigation conserves vital water supplies and makes best use of land. Such use comes well within the concept of conservation. SCS photo.

There's more than beauty in this pattern of contour strip cropping. There's also a story of added profit for the farmer today plus resources saved for tomorrow.

provisions for interstate cooperation in the control and prevention of stream pollution; and, second, federal grants-in-aid to towns and cities for the construction of sewage treatment plants, along with other water purification facilities.

4. There should be a cooperative national and state program for the reclamation of used water by the removal of waste and the use of purification processes.

5. There should be a cooperative national and state program for the development of new ground water reservoirs. This would tap the presently unavailable underground lakes and streams.

6. There should be a national research program designed to investigate the possibility of inducing rainfall through artificial means, the development of a practical method of removing salt from sea water, and the development of methods to use fresh water substitutes in industrial and agricultural production.

Need Positive Program

Unless we follow through on a positive program of this type, in the not too distant future we will find ourselves as a nation in the position of the throat-parched Ancient Mariner who cried, "Water, water, everywhere—but not a drop to drink."

Now is also the time to give serious consideration to the problem of how to conserve our native soil, and make it more productive.

Each year millions of tons of our best soil are eroded by rivers and streams. Add to this the tons of top soil eroded by the wind of our western plains, and we begin to calculate how many acres of agricultural productivity are sacrificed each year through natural causes alone.

For many decades, farmers in this country, schooled in the tradition of their fathers and grandfathers, persisted in the raising of the same crops on the same soil. As a result, the once fertile topsoil has been depleted of its regenerative powers; and in many cases each year the crop yield becomes less and less.

Production Is High

Despite this continuing loss and depletion of soil, our present agricultural production is high—so high that many persons, including the Secretary of Agriculture, term it a "crushing abundance." Therefore, some people believe this is not a popular time to talk about practices that will increase rather than decrease our present farm production. I am not one of those people.

I believe our present so-called agricultural "abundance" is a temporary economic condition.

According to the report in 1952 of the President's Materials Policy Commission, the increased population of this nation will consume 41 per cent more corn, 42 per cent more beef, 23 per cent more wheat, and a total of 25 per cent more of such non-food agricultural products as wool and cotton by the year 1975. As can readily be seen, our present so-called "crushing abundance" will not meet those increased needs of the future.

Potential For Increase

We do have the potential of a substantial increase in agricultural production during the next 20 years. It is estimated that through irrigation, reclamation and other conservation practices, we may be able to add some 80 or 90 million acres to our present agricultural land. But as stated in the Materials Policy report:

"In years gone by, an increase in farm production normally meant an increase in acres planted. But new lands for the extension of farm frontiers no longer exist. Relatively few new acres remain for

the plow. . . . The bulk of future farm production—for the next 25 years or the next 100—must come from land already under cultivation."

Present indications are that by 1975, through straining our production potential to the utmost, this country will nevertheless want to consume three per cent more wheat than we can produce, 23 per cent more fresh vegetables, 11 per cent more eggs, seven per cent more wool, 27 per cent more beef and 30 per cent more pork.

We Must Act Now

This is why I say that unless we adopt now a program of nation-wide soil conservation, improved farming practices, and agricultural research we will be faced with the necessity of having to go abroad for more and more of our food supply. In this connection, the Material Policy report, a great piece of work, predicts that by 1975 our agricultural imports will increase 46 per cent while our agricultural exports will decline by about 36 per cent.

In my judgment, therefore, it is imperative we now begin to explore all ways to reclaim land, control erosion, develop better seeds and fertilizers, improve and encourage crop rotation practices and also launch a long range program of research on how to conserve and preserve the soil on which every one of us depends for physical livelihood.

During the last war, after our rubber supply was almost completely cut off, the scientists went to work and came up with synthetic rubber. But the big difference in this analogy and our impending food shortage is the fact there is no substitute for food. No one wants energy pills as a substitute for steak.

In the long run, civilization, as we know it, could be as seriously threatened by the possible future shortage of these resources as by the possibility of a hydrogen war. In the fields, mines, mountains, and waters of the United States and its possessions lies much of the opportunity to preserve our national security as well as our future prosperity.

Therefore, let us now take stock of our present conservation programs, and adapt them to meet the needs of the future.

It was Daniel Webster who said:
"Let us never forget that the cultivation of the earth is the most important labor of man. When tillage begins, other arts follow. The farmers, therefore, are the founders of civilization."

We cannot accurately predict our country's food needs in the years ahead, except that they will steadily increase. We do know, however, that the sound course both for today and tomorrow is wisely to safeguard our precious heritage of food-producing resources so we may hand on an enriched legacy to future generations.

—PRESIDENT DWIGHT D. EISENHOWER

Soil and water conservation can't be separated! The watershed approach in which we are experiencing renewed emphasis has been part and parcel of our soil conservation concept since experimental and research work started on it nearly 30 years ago. Conservation land treatment for soil erosion control and water management—"gully control" or however you think of it—is just as surely the backbone of any watershed protection and flood prevention undertaking today as it ever was.

—DONALD A. WILLIAMS, *Administrator, Soil Conservation Service.*

Looking ahead, I can visualize thousands of our small watersheds in the condition that God intended them to be: hillsides guarded with a mantle of trees and grass. . . . land on the lower slopes and in the valleys protected by other conservation practices that save soil and hold back water . . . upstream dams, supplementing land treatment, to hold water when we have too much, and release it when we have too little . . . land in watersheds revitalized; water more plentiful . . . man and nature in harmony.

—SECRETARY OF AGRICULTURE EZRA TAFT BENSON

Conservation's Challenge to Journalism

LLOYD E. PARTAIN

Conservation is a cause in which every person has a stake and to which anyone can find reason for a personal dedication. The number of people so dedicated is, and will continue to be, directly proportional to effective effort invested in telling the conservation story in all its aspects. The author sets forth some ideas on how to make our story effective.

CONSERVATION does provide a challenge to journalism. At the same time, it should be pointed out that journalism provides a real challenge to conservationists. It is a two-way challenge.

Some editors actually shy away from many conservation themes and concepts, and they have good reasons for doing so. Many conservation-minded people are critical of editorial treatment of the subject. And in many instances this is as it should be, too.

Often Controversial

The fact that conservation has many and varied definitions, that it means different things to different people, that it is often a controversial issue in public thinking—even among conservationists themselves—presents one of conservation's most important challenges to journalism. The important problem is the arriving at an area of agreement and understanding about the subject. Its far-reaching influence in the welfare of every individual, regardless of his occupation, position or mode of living, justifies treatment in mass communication mechanisms. Because of that significance, it behooves both conservationists and journalists to better understand each other's objectives. Actually they have a great common interest —both want to tell an important story in an interesting and effective way to vast numbers of people.

Make Story Important

How do we make the story important? First, we must rely on facts. Second, facts must be developed in a highly interesting and unique manner in order that the story will attain high readership and attention. In this regard it must be remembered that any good editor today knows his audience (readers) better than anyone else. His technique for obtaining extensive reader interest in any subject he treats must be respected. The editor of *The Saturday Evening Post*, for example, knows the reaction of his readers, the influence his journalistic presentation has on them and what impact each portion of his magazine's content will have on their thinking and action.

Editorial objectives, techniques and influence vary widely, too, or else we would not have the vast number of magazines, newspapers and other forms of printed media offered for the reader's choice. This is as it must be in a democracy where freedom of speech and freedom of the press prevail. No one medium can be all things to all people. Yet the editors of all of them are continually seeking vital material, and it is difficult to think of any subject with greater opportunity for factual, yet interesting, journalistic treatment than the broad field of what I choose to call "conservation logic." The opportunity of influence on conservation thinking and action through the medium of the printed page is almost unlimited.

A Reading Nation

There are more than 7,000 periodicals published and circulated in the United States. More than three and three-quarter billion magazines are being sold each year. In 1955 the total per issue circulation of all the 281 members of the Audit Bureau of Circulation was almost 180 million. Some 1.6 billion single copy sales of magazines are made each year.

Nearly seven out of every 10 adults 15 years of age and over in the United States are regular magazine readers. Over eight out of every 10 U. S. families are magazine-reading households. Magazines are read regularly by 76 million adult consumers. They are read regularly in 39 million of this country's 48,785,000 households.

The combined circulation of morning and evening newspapers with published circulation figures totals some 53 million. We can add to this another 46 million or more Sunday editions and all the weeklies and other types not included.

The conservationist who desires to tell his story in mass magazines and newspapers must consider other facts, too.

We are not only a large country geographically, with differing local interest in conservation matters, but we are also a country of people of many different kinds, from

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many different backgrouds, and often of diverse racial origin. We are farmers, factory workers, engineers, brokers, doctors, lawyers, housewives, salesmen—people of a thousand occupations and interests. Your conservation story must be so written that it will appeal to people of varying interests.

Competition For Space

The conservationist who wants his story told in mass print must recognize the competition he faces for space: national affairs, foreign affairs, amusements, beauty and grooming, building, business and industry, children, farming and gardening, food, health, home furnishings, sports, hobbies and recreations, travel, transportation, wearing apparel, cultural interests, general interest and fiction.

There is "froth" in our magazines, too—light, amusing material. We have humorous skits, cartoons, romantic fiction, pin-up pictures, anecdotes and glamour-puss stories of movie queens and princes. Our magazines and newspapers must entertain as well as inform. They must attract millions of readers of varying tastes and interests. Without their lighter and diverting attractions, their escape offerings, our magazines would not be the vehicles they are for the substantial writing they offer in each issue. Write your conservation story so that it will entertain as well as inform. Good descriptive writing can be very interesting.

The conservationist who is convinced he has a good story to tell must decide whether it is of interest to a national reading audience, a local or regional population or to special interest only and seek an outlet for it accordingly. National issues and national interests, even local success stories with national application, offer one opportunity, whereas a fish or game-management story on a given stream or forest range provides another. There is one sure thing about conservation journalism, as I see it—*there is always an abundance of source material.* But it must be presented in an interesting and forceful way. The photographic opportunities for illustrating good narrative are unlimited. It is my personal observation, however, that conservation writing needs to be more positive, more objective and more practical.

A Public Burden?

I am quite sure that many people who should become readers of conservation subjects feel that conservation is expensive, increases their tax bills and is primarily a bureaucratic governmental endeavor. Conservationists and conservation organizations are, in a great measure, responsible for this situation. The "conservation pays everybody" story has not been forcefully told and cannot be until it becomes a fact, indeed. The extent to which it is true and the portrayal of examples proving it provide good journalistic copy that can and should be sold to more and more editors.

Consider Private Initiative

Private initiative in conservation offers real opportunities. The dollar sign—the profit aspects—and there are excellent examples of this, need incorporation in more conservation copy.

This is not to say that conservation leadership needs to abandon its rightful efforts in developing sound public policy and programs. These efforts, too, make excellent journalistic source material depending, of course, on their soundness. In this regard it should be remembered that the printed word can educate or inform as well as enlighten people. Keep the writer of the editorial page

How well are you telling the conservation story? It can be light, amusing, serious, dramatic, humorous—and sometimes dull. The key lies in adjusting a vivid, lively presentation to the particular audience you are reaching. Pictures, like this one, can help.

or column in mind. His influence on the reader is tremendous.

There are many other opportunities for converting white space into effective conservation messages, too. Space here permits citing only a few. Informative advertising serves as one forceful means. For example, most everyone is familiar with the conservation efforts of the Weyerhaeuser Timber Company's Tree Farm Program. This beautiful four-color informative advertising tells the story of Tree Farming not only as it is practiced on Weyerhaeuser lands but among private forest landowners throughout the country. There are other examples of this technique of selling conservation effort. One of the great advertising success stories has been the Smokey Bear Program. Many corporations tie in conservation concept and effort as a focal part of their forceful advertising. This technique is extremely effective and more should be done with it and about it.

Cartoon Treatment

Cartoon treatment or animation of conservation subjects in both advertising and editorial copy have proven very effective. No doubt, this technique, often supporting well-written narrative, can be more widely utilized. This is especially true in the case of youth and children's literature, but by no means limited to this group.

Conservation presents a direct and unique challenge to editors of and contributors to association and organization magazines and house organs. For most of these there is a captive audience. The readers' interests, for the most part, are somewhat of a specialized nature. Specialized interest often requires specialized treatment. *There is often the danger, however, especially within conservation organizations, that we find ourselves "talking to each other" and saying what we like to hear each other say.* This is true whether on the pages of our magazines or in our meetings and conferences. Most of us are interested in new members and new readers of our magazines. In this connection, the editors and contributors can have a significant influence and do have a real responsibility. Fresh, vital and, often, practical viewpoints are needed in much of our conservation literature. And some substantial progress is being made by certain association magazines. I would point to American Forests as one example, where the open-forum-via-print technique and other interest-getting styles of journalism are being used effectively.

Keep Flexible

I have attempted to cover briefly some areas of Conservation's Challenge to Journalism as I see them. The joint influence of these forces can be vitally important in the welfare of our nation and its people. But we must be progressive in our thinking and action. Let's not permit any preconceived formulae or narrow interests to strait-jacket conservation in journalism. We can support any set of good principles and still be flexible. Without flexibility we cannot progress and keep pace with, much less keep ahead of, these fast-moving times—an era of even greater need for "use without abuse" in which "conservation pays everybody" lies immediately ahead. It is a story that needs to be told in many different and interesting ways. Mass communication must be utilized and journalism in printed form can have real and lasting effect on the millions of people.

Conservationists and journalists can work in harmony on that communication job.

Conservation has something that appeals to everyone Find the part that appeals to your audience and the selling job is half done. SCS photo.

The Human Side of Watershed Programs, Part II

E. J. NIEDERFRANK AND WENDELL R. TASCHER

A previous article (December 1956) pointed out that various human factors affect in one way or another the development of watershed programs. Several principles of program development considering people were listed. In this article an actual case is reported to illustrate steps in the social action process and how various human conditions were dealt with in achieving progress on a particular watershed project.

THE DEVELOPMENT and carrying out of any kind of a community program is a matter of growth and social process among people. A seed doesn't suddenly bear fruit; it germinates, grows into a plant, blossoms, and only after a full season is there wheat. So it is with an idea; it grows into a program which is carried on; it grows as people who are concerned with the program grow. This growth takes place between the initiation of an idea and its acceptance, then in the outlining of a program through the organization and carrying out of a plan of action. This is what scientists call the *Social Action Process.*

Get People Involved

More and more people become involved from the start of an idea with one person or small group to the completion of the project. But the big questions are: Which people? Who sees who? About what? When? Where? How are the ideas of the people developed and made known? Who directs the steps leading up to the action? Who performs the action and evaluates progress along the way?

Of course, this process does not proceed like a string of hot dogs. There are no sharp starting or cutoff points. Sometimes work may be going on—development may be taking place—in all four of the stages at the same time. The main thing is that a thorough job be done on each before getting too far into the next stage. The phases are no different, really, than those in the construction of a dam or in getting a farm in operation, except in watershed program development it is the people—families, groups, communities—that are the girders and mortar of construction.

In the rolling country of the upper Piedmont in South Carolina, Twelve Mile Creek becomes quite a river which bisects Pickens County. About in the middle half of the county, shaped like a heart, is the watershed which also includes Rice Creek and several other minor tributaries to Twelve Mile.

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Twelve Mile Creek watershed has about 800 farms, several towns and several industries, and a dozen or more neighborhoods and small communities. Total population is about 8,000, of which about 3,500 are on farms and 4,500 nonfarm, including several small villages and people on residential farms. There are churches, schools, farm organizations, civic groups, public agencies, commercial firms, local officials and other leaders, and not the least, families. All of this makes a great complex social network with lots of little networks in between.

The farms average about 60 acres, mostly of Capability Class III, IV and VII lands. In between and over the higher hills are forest holdings and farm woodlands, mostly deciduous trees and shortleaf and Virginia pines, with Class II-w and V-w bottom lands subject to flooding here and there. According to the watershed survey, about 50 percent of the farm land is seriously damaged by sheet erosion and occasional shallow gullying; 50 to 70 per cent of the top soil is gone. Nearly 85 per cent of the farm families obtain part of their income from other sources than agricultural production. Some families are thinking about farming a bit less, but only a few are moving off the land outright or quitting agriculture altogether. Reason for staying is that they are not sure enough of the future to make a complete break from farming. But at the same time, they realize more and more that to keep one foot on the land requires some attention to keeping up the place, which in this country means good use of sound conservation measures.

Pilot Project Program

The Soil Conservation District supervisors were informed in late 1953 that they might have some special assistance on watershed development under a new pilot project program provided for in the 1954 fiscal year Appropriation Act for the U. S. Department of Agriculture. They were asked to let the Soil Conservation Service know within a few days whether or not the District desired to accept the idea and develop a program. (Actually they first heard about it by reading it in the local newspapers.)

From then on it was a matter of going ahead from

scratch, making the program the people's program just as would be necessary if it had been initiated by some local person. It should be noted that unlike this pilot watershed program which was initiated by Congress as a federal demonstration of watershed work, the new watershed program under Public Law 566 is based wholly on local action in initiating, carrying out, operating and maintaining watershed projects.

Even so, much progress has been made and much has been learned (which was the purpose of the pilot projects) under the skilled and hard-working leadership of the various agencies. Among these were (1) the chairman of the district supervisors; (2) the work unit conservationist; (3) the county agricultural extension agent and his assistant who was employed to work mainly on community organization especially as it relates to the watershed program; (4) vo-ag teachers; (5) Farmer's Home Administration representative, and (6) representative of the South Carolina Commission of Forestry.

These people have walked together practically every step of the way since the first word about the project. Their work has been *problem-centered,* not *agency program*-centered. The need for development of family income and improved living through sound resource use and development was and still is considered the major problem, while the particular agency measures or programs are but a part of this over-all single objective.

Here are the main steps taken from the standpoint of the social action process in the development of the Twelve Mile Creek pilot watershed program so far. After the district supervisors and the work unit conservationist received word about the pilot project, the first thing done was to talk the matter over with the county agricultural agent. The proposal was discussed up and down, pro and con, over the next few days. They studied their maps and the economic, the erosion and the flood control problems as a basis for determining conservation needs.

It was decided to discuss the matter with a larger group of leaders in the county before accepting or rejecting the offer. (*Further initiation and legitimation.*) A meeting was called to which were invited representatives of the Agricultural Conservation Program Service committee, the Extension committee, vo-ag teachers, leading farmers, the newspaper editor, county road officials, school superintendent, rural church pastors, public health, feed and seed dealers, bankers, the Congressman of the district, the county legislative delegation, and other key leaders who it was thought might have a concern.

The *meeting was called* by a letter over the supervisor's signature, drafted jointly by the county agent, work unit conservationist, and chairman of the supervisors. The *supervisors presided* over the meeting while the *professional people presented background information* and served as resource advisers. The boundary lines and other features of the watershed were explained in order to acquaint the people with what a watershed program had to offer.

Develop Local Interest

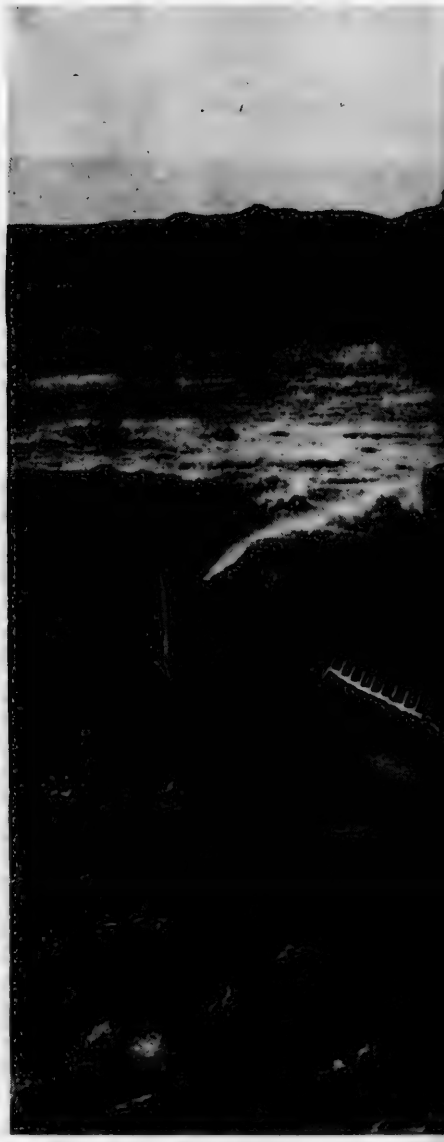
After the supervisors notified Washington of their acceptance of local responsibility, the next task was to develop interest and understanding among the people locally. (*Still more initiation and legitimation.*) A round of community meetings was arranged and run by the supervisors, in order that the county generally would be at least somewhat informed about the program and unfounded rumors would be forestalled. Every land owner was invited to these meetings along with other local leaders and officials who might have a concern one way or another in the project or who had influence upon others. This was considered a basic step because in the final analysis, the action on the watershed program was going to have to be that of individual farmers and the people in the neighborhoods.

Through these county and community meetings, the program was discussed by the people, not just sold to them. Questions were raised and comments made about

This group of local farmers met on Twelve Mile Creek to discuss proposed channel improvement work. Talking projects over with folks in the watershed ahead of actual work on a project can go far to improve human relations.

A century of soil-management experience backs your success with

...International watershed equipment!



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The job-matching bonus-powered International crawler line offers you a choice of power-package sizes for every size of watershed job. Giant-sized TD-24's, with 200 net diesel engine horsepower, provide cost-cutting capacity to build the largest flood-detention structures. Both 124 hp* TD-18, and 95 hp* TD-14 are widely used by conservation contractors. And the smaller-sized 64 hp* TD-9, and 51 hp* TD-6 have the power-weight-traction balance to give you amazing material-moving capacity!

International gives you a wide choice of bulldozers—a blade for every conservation use and preference, to work with every International crawler size. Two self-propelled Payscraper® sizes will meet your need for longer-haul, high-speed dirtmoving!

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*net engine horsepower

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International Harvester Products *pay for themselves in use*—Farm Tractors and Equipment ... Twine ... Commercial Wheel Tractors ... Motor Trucks .. Construction Equipment—General Office, Chicago 1, Illinois.

This TD-14 with hydraulic dozer is building a 2,500 cu yd "gully plug" to control erosion in a deep wash. "An operator can learn to handle this easy-operating hydraulic dozer outfit in one-half hour," states Owner Richard New, Leavenworth, Kansas.

Contractor James Mueller uses the scarifier attachment on his International Drott TD-9 Skid-Shovel—to loosen hard clay and a ledge of shale—building a farm lake near Evansville, Indiana. This outfit that can scarify for itself produces profitable yardage even in extreme hard ground conditions.

These two TD-24 Torque Converter models are building a 75,000 cu yd erosion-control dam on the Hopi Reservation near Saunders, Arizona. States Operator Tod McDonald for Contractor Jim McDonald: "TD-24 Torque Converter model features that really pay off here are the power and speed to move earth faster than any competition."

how it would affect individual farming systems, benefits to be derived, costs of development, what the agencies would do and what the farm families would do, the effect on roads and bridges, principles of conservation, how the retention dams would work, and effects on farms.

It was emphasized that for many years individual farmers had done good conservation work and that this was still important. But that now the aim was to get all farmers to do so as part of a weaving together of an overall pattern of conservation which would include not only land treatment measures on individual farms but also those of a public nature, such as roadside improvement, stream clearance, flood prevention by small retarding dams and reforestation.

County agent Jesse Wood said that "if we have learned only one lesson in extension work over the years, it is that the most likely way to get people to carry out something is to inform them about it and involve them in the discussion and planning of it with the final decisions resting on them."

Overall Approach

Work unit conservationist Guy Lindsey added that "we tried to get the people to appreciate that it was a matter of recognizing conservation problems both on individual farms and on a watershed basis and that both were important as part of an overall approach if there was to be an effective solution to all the soil and water problems of the area. It was emphasized that the additional funds were available to assist in doing a job worked out with the people, not funds to give away or to misuse."

Every measure was presented on the basis of its benefit-cost ratio. The special benefits that might go to one area or group, perhaps through the effort or sacrifices of others, was discussed on the basis that what helped one's neighbors, helps all. Such results as these can and do happen: higher sales values, more efficient farming systems, maintenance of productivity, recreation opportunities, improved roads, reduced public expense from floods, and protection of lands. In fact, the basic economy throughout the area is still enjoying industrial development, more income and increased happiness in general.

Early in the planning, the supervisors, Soil Conservation Service staff and Extension agents studied the watershed carefully, walked many streams, and collected data on conditions, in order to have a basis for working out a plan of action. (*Planning and organizing program.*) They decided to work subwatershed by subwatershed and to start work at the top coming down by one or two neighborhoods at a time rather than by a mass countywide approach. They decided to start where they could get the best participation and also show a variety of accomplishments. Priority work areas were established by the district supervisors. Policy regarding location of dams was discussed and alternate sites that would provide an adequate level of flood protection were spotted. It was decided that effort would be made to avoid inundating valuable cropland or buildings of any given farmer. The small acreages of Class I and II cropland were important to income.

It was decided that the individual farm land treatment plans came first in order to retain the soil on the slopes, but that other aspects of the watershed program would also be initiated according to plan. Conservation plans including proper land use, crop rotations, terracing, reforestation, gully control and bottomland improvement would be worked out in cooperation with the Soil Conservation Service, but the farmers themselves would have the final say. All of these points were included in discussions with the people.

This crew planted trees in Twelve Mile Creek Watershed. They are (left to right) C. V. Leslie, W. B. Trotter, F. G. Lindsey and Ralph Evans.

This photograph was taken of a roadside cut in Twelve Mile Creek watershed before treatment. See the change in the photo at the right. SCS photo.

This is the same roadside cut shown in the photograph at the left. Note that it has been shaped and seeded as part of the watershed treatment. No more erosion here.

The State Extension Service would expand and correlate its educational work with watershed plans and help farmers make changes in farming systems. Extension would also take the major responsibility in mobilizing community support as the program progressed from neighborhood to neighborhood. An additional extension agent was employed to work primarily on this phase, including expansion of a community organization and development program in the county.

The earlier general information meetings were followed by lots of small neighborhood and special group meetings at crucial times whenever special work was to be undertaken in particular places. (*Further legitimation, planning, action.*) Small tours were held as soon as three or four jobs were completed, showing farm changes, stream clearance, retarding dam construction, roadside improvements, terraces, gully control, and reclaimed bottomland acreages. Some spots were visited by scores of groups. Colored slides of developments were also made and shown as work progressed. Posters of contouring, photographs of tours and work in process were shown in store windows and in newspapers. Through all these seemingly minor but yet very significant activities, the people were kept informed and given a sense of involvement in the program. Pride was developed as they became aware of accomplishments.

Discussions of the watershed program were held with vo-ag classes and with the young farmer classes of the vo-ag teachers. The Easley FFA group put on a watershed display at the county fair. The newly organized community development clubs frequently had watershed discussions at their meetings. The program was also covered in local radio broadcasts and in newspaper articles and editorials. A TV show of watershed work was shown. Special tours were held for school children and civic groups.

Another *adaptation to local conditions* was made by holding the special information meetings and tours for neighborhoods at several different times of the day in order that part-time farmers and others who work on odd shifts in industry could attend. Certain phases of the program became area wide, such as reforestation and certain farm land treatment. But construction of a dam, stream clearance, and other intensive jobs were discussed with the local people in neighborhood meetings, tours, and informal visiting, prior to start of such jobs.

"All of this informing of local people through local group methods, takes lots of personal attention. But we do it directly and indirectly in connection with various regular activities, and it pays off well in the long run," said Frank Fleming, Associate County Agent who works on community organization.

The county extension agricultural planning committee formed a subcommittee on conservation, which assists with the planning and leadership of extension activities in the watershed program as the central core of all the committee's conservation work. The program was correlated with other extension programs such as dairying, livestock production and field crops. The home agent has been kept informed of the program but the home demonstration clubs were not directly involved as such. Many women learned about the program through the other methods. Various garden clubs have also asked the Extension and SCS people for speakers on the watershed program in their meetings. One result of this is that the State Garden Club is including it in the program of their next annual meeting.

Involves Many Groups

"It has been continually recognized that this was not going to be a one-agency program," said Guy Lindsey, work unit conservationist. "The program was frequently discussed and new developments mentioned at meetings of the county professional workers' association, which also frequently included the soil conservation district supervisors and the county ACP committeemen."

This photograph shows a group of local farmers who stopped by to look over construction of the first flood retarding structure in Twelve Mile Creek watershed. From left to right, they are Paul McDaniel, Otis O'Dell, Henry Lignon and Mr. Cantrell. This type of interest comes as the result of continuous work to establish and maintain good human relations throughout the entire watershed program. SCS photograph.

By involving the county Public Health Department, it was easy to get permits for retarding dams and to conduct a mosquito control program around the sediment pool areas behind the dams. One bit of cooperation with the local REA co-op consisted of establishing vegetation on areas under power lines. The Forest Service assisted with reforestation areas in the watershed.

What About Easements?

The problem of obtaining easements for flood prevention structures is and will be in many cases a major watershed development problem. But the solution of this problem will frequently be eased where there already has developed lots of community support for the program. Activities and procedures like those mentioned above produce community understanding and support, which, in turn, will frequently greatly help in solving the easement problem.

This has been the case in the Twelve Mile Creek project. Care was taken to see that the "right" persons made the contacts, not necessarily the supervisors. In one case a farmer continually refused permission for even the survey of an area. Then one day the work unit conservationist happened to mention this while visiting a neighboring farmer. "Why, I know Bill," said the neighbor. "I gave him a job once and we've been friends for a long time. I'll talk to him about the survey and proposed dam." It wasn't long until the word was received by the Soil Conservation District supervisors that the reluctant farmer was ready to go ahead.

In another case a dam required easements from 17 land owners, most of whom were members of a country club to which one of the district supervisors also belonged. There was little hope of obtaining the easements individually from the 17 owners by the usual discussion. But the one member who understood the watershed program spoke to the club president saying: "There is some talk about locating a dam near here in this watershed program we are hearing so much about. Now, if we get behind this project perhaps we can get the dam located at 'blank' point (which he knew was the engineer's designation), and this could be of great benefit to our club. Think of the recreation possibilities, and the like." The president was excited; he brought it up at the next executive meeting and club meetings. The first member advised in favor of the dam but cautioned against too much speed, saying, "we don't want to lose this chance." In the end the group got behind the project, asked for the dam and helped get the easements. Easements from 17 individuals were obtained easily.

In another case it took more time and several re-explanations and reassurances about the height of the impounded water in a proposed pool. But the staff and supervisors were patient and answered all questions with kindly explanations. The farmer decided to advise with the county extension agent—a trusted friend. The agent, being already in on the program, explained that it was the thing to do but he did so cautiously and kindly. He advised the farmer to also talk with certain other persons. The easement was soon granted.

In still another case, work on a gully affecting a road and other farms was held up because one farmer near the head of the gully refused to give permission. The agency men would talk to him casually from time to time as occasion provided, but were careful not to force the issue. Finally, one day he met the work unit conservationist on the street in town and asked him to come out to the farm to talk things over. He said, "My neighbors are beginning to make it hot for me, holding up the works on the project."

Lindsey went to the farm one day soon afterward, and in the discussion which ensued, he learned that the real

reason for the man's objection was due to his wife's objection. Her objection, in turn, was based on some unfortunate experience which she had remembered her father having had on her home farm, and she was overcautious in principle to dealing with any agency. Finally realizing this factor in the "Whys" of resistance, the men easily talked the family into going ahead with the gully control work.

What was back of success in all these cases? *Patience and more patience. The right people seeing the right people. Sticking to the facts and giving kindly explanations* without any pressure. It was made clear in all the public information that the easement contracts are not made with the government, but with local district supervisors. The people like this feature very much.

Many People Help

In the Twelve Mile Creek project the supervisors with the help of other local dealers did most of the contracting for easements and actually delivered the papers for signature. A local real estate agent donated his services to the district to help prepare easement papers. The district supervisors are also careful to utilize the services of acceptable persons or groups who volunteer assistance.

As Jesse Wood, county agent, said: "Not everybody can sell the same man but every man can be sold by somebody. Another thing we are careful of is to not push for an answer too soon. We stick to the facts, help the family see the different alternatives, show them other cases, then patiently wait. Some time later to some person the family will say, 'Yes'."

Summary

In summary, here is the gist of what the professional workers advised about watershed program development as indicated by their experiences with Twelve Mile Creek so far:

1. The main obstacle is the difficulty so many families have to find time and money to put their own farm soil and water conservation plans into operation especially the part-time farm families of which there are so many in this area.

2. The small profit margin of farming in general, especially in this region, is also a retarding factor to interest in conservation. Yet the people feel the need for staying on the land and keeping up their places. As Jesse Wood said to us, "we have to have conservation wherever there are land and people, do we not?"

3. They also found that much can be done by doing it in the community way. That is, by involving all the leadership—agency, commercial and special interest leadership—and by getting the information before the people through the community groups.

4. Divide up the program into subprojects, usually by subwatersheds, and aim for observable accomplishments. Then show them to the people as work progresses.

5. Understand the attitudes of the people, the social structure and the leadership. Accept and work with the people as they are. Anticipate reactions and use a little psychology in selling the people on particular problems. Remember that for every belief or action or resistance, there is a "Why." Try to understand the "Why" and then tackle it.

6. Make facts, education and information your theme —not argumentative salesmanship and pressure. Give folks the facts and consequences, pro and con. Let it be the people's program as they have heard and seen it discussed and conducted through the district supervisors and other county and community leadership. A watershed program is available, if they want it and will adapt it to their situation.

7. There is no sounder approach than through teamwork among interested agencies. Each one can have some relationship to and part in the program.

8. To make the community group activities on watershed program successful requires lots of personal contacts, frequent mention of plans by the professional people individually as they go about the county. Equally important are lots of contacts between leaders themselves, notices by mail and followup discussions. Keep before the public evidence that programs are being run by the people, not the agencies.

9. Keep clear on the state and local laws that may pertain to the subject.

10. Finally, PATIENCE, PATIENCE, PATIENCE. Give the people time to learn and grow.

Let us look back again to the Social Action Process described above and to the principles stated in the first article. The early steps that were taken on the Twelve Mile Creek project served to wisely *initiate* it and to produce the needed *legitimation* for continued progress. Only rarely was there need to go back to fill in situations or correct mistakes before being able to proceed further in a given community or on a given farm. The continued contacts and joint planning produced *sound action programs* and conservation achievements which resulted in *continued acceptance* and *continued accomplishments* leading toward the ultimate goals of the project. The end result, already being observed, will be not only a good soil and water conservation program in this area, but improvement in family incomes and community development, to say nothing of the growth in leadership and community spirit.

Squawbush in Windbreaks in Eastern Colorado

W. S. SWENSON

Little do most people realize the importance of trees until they get into an area which has few trees. There, trees take on a greater significance—especially as windbreaks. In dry areas where climate is severe, windbreaks are difficult to maintain. Trees must be chosen carefully and given intensive care. In parts of the Great Plains, squawbush has proven valuable for use in windbreaks. The author describes its use for that purpose in eastern Colorado.

FROM the days of the earliest settlers in the Western United States, farmers have wanted protection for their homes from the high winds. They knew that where trees grew there was protection from the winds. Many of the settlers planted trees they were acquainted with in areas of more moisture. But the climate was more severe. The annual precipitation was less and temperatures were higher in summer and lower in winter. Trees and shrubs that had grown in the moist areas failed when they were used in the plains.

Better Adapted Species

Gradually there evolved better methods of selecting species of trees and shrubs adapted to low rainfall areas. Arrangement and spacing of trees and shrubs to act as wind barriers were more scientifically developed.

Only the hardiest trees would grow when planted in the plains, and these required constant cultivation to insure survival. Even though these trees and shrubs were more difficult to grow in the plains, their values to farmers were greater. A windbreak in the plains makes life more pleasant for both the farm family and the livestock; reduces fuel and livestock feeding costs. The windbreak beautifies the home and provides food and cover for the birdlife that helps reduce insects and furnishes good hunting. Windbreaks also trap drifting snow, or cause drifting of snow away from the buildings and yards instead of in the yards.

Eastern Colorado is a part of the Great Plains where climate is severe. The climatic conditions and the fact that this area is natural grassland limits the species of trees and shrubs that are suitable for windbreaks. Soil Conservation Service technicians have tested many plants so as to furnish Soil Conservation Districts and their cooperating landowners with a list of those plants best adapted to their locality.

Squawbush (*Rhus trilobata, Nutt*) is one of the better shrubs for windbreaks in the plains. Among many names used for squawbush are aromatic sumac, skunkbush, quailbush, lemonade sumac, three-leaved sumac or ill-scented sumac. Squawbush is truly a western plant. It occurs naturally over most of the northwestern part of the United States. In its native habitat squawbush is drought resistant and cold hardy. It occurs on dry, well-drained sites and grows in the sun or partial shade. For example, in the White Sands of New Mexico, it continues to grow almost covered by the moving dunes and even when the wind cuts the sand from around the base leaving the plant standing grotesquely on exposed roots. It grows as a single plant or it may form clumps of considerable size. Its hardiness, the fact it is unpalatable to domestic livestock and its ability to stand silting and erosion which may expose its roots makes it effective for both windbreak and erosion control plantings.

Good Wildlife Cover

The plant has excellent qualities for wildlife; it provides good cover and nesting sites for birds. Species of game birds known to use the seed as food include prairie chicken, Merriam turkey, pheasant, sagehen, ruffed grouse, and bobwhite, valley, Gambel and scaled quail. When we include the song and insect-eating birds, the list goes on to at least nineteen species known to use the seed as food. It is widely used by the Colorado Game and Fish Department in wildlife habitat plantings.

Grows to Eight Feet

In most windbreaks in eastern Colorado, squawbush reaches a height of six to seven feet in five or six years. Its maximum height in 15 or 20-year-old windbreaks appears to be about eight feet. As the plant gets older, it gets bushier and spreads slightly. When spaced four feet apart, the crowns meet in about three years. After six years crowns have a spread of six to eight feet and the growth has a density that will tend to turn livestock as well as the wind. It is not palatable to livestock so it helps maintain density in the lower half of the windbreak even when livestock get into the windbreak.

In eastern Colorado it is commonly planted on the windward side of windbreaks because it will endure drought, tolerate cold, and stop drifting snow. It can be

W. S. Swenson in Woodland Conservationist, Soil Conservation Service, Colorado Springs, Colorado.

Squawbush growing on the Amen Brothers farm in Logan county, Colorado. Note the dense, vigorous growth which helps provide protection from the wind.

planted next to fast growing plants such as siberian elm. The initial survival of squawbush has been higher than any other shrubby species used in Colorado windbreaks. The length of life of the species under these conditions is not known, but plantings made 20 years ago are still vigorous and in good shape today. These same plantings are also remarkably free of disease and insect damage.

Squawbush grows on soils from sandy to clay loam textures. In one planting on a raw shale road bank slope —extremely poor site condition—the height growth was less than eighteen inches in sixteen years. Yet survival has been good, even though no other vegetation has become established since the road was built.

The fruit matures as clusters of red berries which are sticky and which persist through the winter. The number of seeds per pound vary from 10,000 to 25,000. Many seeds are blank and germination is quite low. Squawbush does not propagate readily from cuttings but does grow well in the nursery from seed.

Seed source of nursery stock is important and should be considered when purchasing seed for propagation of the plant. The plantings that have shown outstanding success in Colorado, New Mexico and Utah were grown from seed collected from native stands in southeastern Utah and southwestern Colorado. Plants grown for two years in the nursery have been satisfactorily used for field plantings. Some other states have tried this shrub from a different seed source and the results have not been as satisfactory. The wide range of conditions under which squawbush grows natively, and the large number of strains or varieties that have developed, make it important to know the seed source when growing nursery stock for different localities and different uses. For best results the seed source of planting stock should not be too far removed from the place of its intended use.

Squawbush is available as seedling stock from only a few nurseries in the United States. It is grown largely by nurseries dealing in plants for erosion control and windbreaks.

This 9-year-old planting squawbush helps protect the rest of the windbreak from severe weather. It's on the Howard Schmidt farm in Logan county, Colorado.

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Conservation Research—And Lots of It

CHARLES R. BALLANTYNE

Charles R. Ballantyne

Research has been defined as careful and diligent investigation. This requires time—often years—to average out field variations. Perhaps it is this long term aspect that leads people to "forget" just how much work is going on.

After hearing a few remarks about the lack of conservation research in his own state, the author took stock and came up with a surprising total. Do you know about the conservation research in your state?

IOWA was one of those states which assumed early leadership in the field of soil and water conservation research. One of the nation's first research stations in this area of work was established near Clarinda on the Marshall soils of southwest Iowa. After more than 25 years of intensive work, studies at this experimental station are still conducted cooperatively by the Iowa State College Agricultural Experiment Station and the Agricultural Research Service of U.S.D.A. Such well known investigators as G. W. Musgraves, R. A. Norton, G. M. Browning and Frank W. Schaller have at one time or another been prominent in the work carried on at Clarinda. These investigations are currently headed up by William E. Larson.

Subsequently, it became obvious that this work needed to be expanded to other areas in the state which had soils with different characteristics, different topography and varying climatic factors and capabilities of use. Now measurements of soil and water losses are continually being studied at five different locations in Iowa. At these five experimental farms measurements are made of soil loss, runoff, soil moisture and crop yields as affected by different crops, crop rotations and mechanical practices such as contouring, listing, terracing and mulch tillage.

Data from these experiments have been used to develop a mathematical equation whereby the amount of soil loss on any farm in the state with its own particular set of conditions can be estimated. In this formula, relative numerical factors based on research have been assigned to percent of slope, length of slope, soil type, degree of past erosion, crop rotation, supporting conservation practices and the level of management in use on the farm. In addition a figure for maximum allowable or permissible soil loss has been estimated for each soil type in Iowa. (Permissible soil loss is a conservation goal for Iowa farmers which is both realistic and attainable.

By multiplying these numerical factors together (applicable for any farm), a farm planner or manager can estimate whether the soil conditions and land use pattern on that farm will control erosion within permissible limits. This technique is now used by Soil Conservation Service farm planners in Iowa.

The addition of applicable data from research carried on in other states plus the use of modern electronic computers has greatly increased the reliability of this procedure and broadened its base of application.

Agricultural research relating to soil and water conservation is carried on at eight other locations including the central experiment station at Ames. Comprehensive rotation and soil fertility experiments are designed to determine the combination of cropping systems and treatments which give most efficient production. Work goes on continually to develop new higher yielding and

Research serves its purpose when it is put to practical use of some kind. This is one way research is brought to those who can put it into profitable practice.

Charles R. Ballantyne is extension, soil conservationist, Iowa State College, Ames, Iowa.

This photo shows runoff control plots on the Western Iowa Experimental Farm. These tanks catch both soil and water runoff from this 12 percent slope.

better adapted crop varieties. Yield responses of different crops on different soils to various nutrient elements both singly and in combination are under intensive and continual study.

Tillage methods for corn are still being tested and new methods developed with emphasis on seedbeds resistant to erosion and favorable for high yields. Conventional methods, mulch tillage, listing, ridging and once-over methods are under investigation. Wide row corn planting with interspersed cover crop seedings is being tried at several locations.

Of a more fundamental nature is a series of tests studying the effect of soil structure on crop yields. Structure variations are brought about by the use of chemical soil conditioners as well as organic residues.

The development of specifications for level terraces in western Iowa was largely a product of research and these specifications are currently being studied and revised in light of recent research.

Parallel terrace systems have been installed on three of the state experimental farms, as well as on farms of several cooperating farmers. At this time it appears that parallel terraces may be practical in certain areas of the state.

Other research has been done on terracing costs and the amount of settling in terrace ridges as influenced by the type of construction machinery.

Also related to this area is a study on the performance of low-cost rock and sod flumes in the control of gullies of medium size.

In the field of hydrology, studies are being conducted in cooperation with the Soil Conservation Service in the Little Sioux Watershed area. Fifteen gauging stations have been set up in sub-watersheds in conjunction with the Little Sioux Flood Prevention Program. These gauging stations measure rainfall, runoff rates and amounts of sediment. It is hoped that this information will make it possible to develop methods of predicting volumes and rates of runoff to be used in design of erosion control structures.

Other work has been done recently on estimating water yields from watersheds in southern Iowa. These design data consider five factors in making predictions of waterflow into reservoirs: (1) climatic conditions; (2) land use; (3) slope of the land in the watershed; (4) type of soil; and (5) land management and conservation practices in the area.

Studies are underway to develop techniques for measuring soil permeability, draw-down rates and yields of water from tile lines with different depths and spacings. Other studies deal with the hydraulics of the flow in

tile drains with variable grades and with investigating backfill material used to cover tile drains.

Experiment station and USDA soil scientists are studying the history of geological changes that have taken place in Iowa. Knowledge of these changes are basic to a determination of the origin and development of Iowa soils and will aid in making more accurate soil surveys. Studies of profile properties of Iowa soil types are also being made throughout the state.

Another project in this field cooperative with the Soil Conservation Service is a project on the preparation of soil maps for individual farms for planning in soil conservation districts and for estimating land conditions by various physical and political subdivisons of the state. Closely related to this is work on classification and mapping of soils and the preparation of county soil reports.

In the field of economics there is an intensive study being made on how far a farmer can and should go with regard to erosion control measures with different levels of capital funds available. Some types of erosion control practices represent long range investments and the returns from this type of investment are spread over a long period of years. Such practices might be terraces or erosion control structures. From this study it is hoped that guides can be established for the use of farmers in timing their investments of this type when capital is limited.

For some seven or eight years there has been a continuing study on the obstacles to the acceptance of erosion control practices and how to overcome them. This study is designed to ferret out the reasons why farmers do not adopt soil conservation systems of farming more rapidly.

A study is underway to bring about a physical and economic analysis of watersheds as related to soil and water conservation. This work is concerned not only with the gathering of physical data concerning erosion, siltation, water yield and crop yields on a watershed basis but also the planning and application of sound practices and land management to provide the most desirable use of resources both public and private at the watershed level.

Iowa has participated in a national summary of soil and water losses from watersheds. This data is just becoming available at the present time.

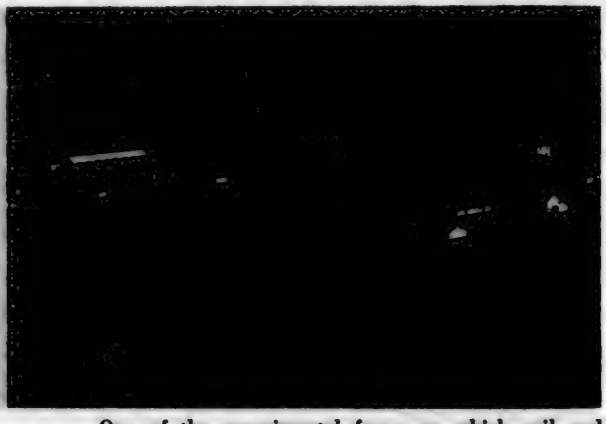
There is a new device being used at the Iowa State College Experiment Station in the area of soil and water conservation investigations. This device is a type of rainfall simulator and is being used to collect data on splash and wash erosion under a standard set of conditions. This seems to offer a satisfactory method of collecting information on the relative erodibility of different soils with and without cover and under different levels of management.

Many times, soil conservation systems of farming result in greater quantities of forages which must be utilized profitably to enhance the overall income from the farming business. The utilization of these forages is being constantly studied to give farmers better alternative choices in their use. Closely related to this area of forage production and utilization are the pasture improvement studies being carried on at selected locations.

Iowa State College maintains one of the few trained staffs in the field of Agricultural Climatology found in the United States. The work of these men is throwing light on the relationships of climatic factors such as rainfall and its distribution, soil moisture supplies and temperature as they affect the production of crops and the probabilities for crop yields.

Iowa conservationists feel a special responsibility for moving ahead in research relating to soil and water conservation. Into the care of our farm people was given some of the world's truly great soil resources and along with that stewardship goes the responsibility for good husbandry and wise use.

Tillage methods for corn are still being tested with emphasis on seedbeds resistant to erosion and favorable for high yields. Hard ground listing on terraced land.



One of the experimental farms on which soil and water conservation research is underway. Note hills formed of highly erosive, windblown soil in the background.

Book Reviews

A WORLD GEOGRAPHY OF FOREST RESOURCES. *Edited for the American Geographical Society by* STEPHEN HADEN-GUEST, JOHN K. WRIGHT AND EILEEN M. TECLAFF. *The Ronald Press Company, 15 E. 26th Street, New York 10, New York. 750 pages, 58 maps, 111 photographs and charts. 1956. $12.50.*

Here is a book that has long been overdue. It is a complete appraisal of the world's timber resources in terms of their natural functions and man's dependence on them. Actually, it is the only book on the subject available today.

A World Geography of Forest Resources was edited for the American Geographical Society by three outstanding authorities: Stephen Haden-Guest, John K. Wright and Eileen M. Teclaff. In addition, 34 contributing forestry experts and geographers representing 18 nations were responsible for writing the 31 chapters that make up the text. The book is profusely illustrated with excellent photographs, maps and charts. These help to give emphasis and clarification to the excellent material contained in each chapter.

Generally speaking, this comprehensive volume clearly appraises the world's forest resources in terms of raw products and their relationship to man's need—food, shelter, heat, comfort and aesthetic values. It also explains forest relationships to rainfall, temperature, topography and soils. All these and other equally important factors give the reader a better understanding of the part forests play in the progress of mankind. For example: We are told that there are two and a half billion people in the world and nine and a half billion acres of forest, or almost four acres per person. From these acres must come the countless number of forest products required to meet the world's industrial, agricultural, domestic and recreation needs. With population continuing to rise, the pressure to improve forest management will increase. There is no alternative.

It is difficult to single out an outstanding chapter. This reviewer, however, was impressed by the chapter on "The Forest Products Industries of the World". The comparative uses of wood by countries are presented in table form. In addition, there are discussions featuring the natural wood industries, wood conversion, production and consumption and others. These cover the many uses from newsprint to cork.

Twenty-five regions or nations, starting with Alaska and ending with Oceania, are ably discussed by outstanding authorities. Each presentation covers the several forest regions, forest resources in terms of area, volume of timber, forest industries and forest policy. This data gives the reader a better understanding of the forests of the many countries that make up the world. The concluding chapter entitled "The Outlook" is not only stimulating but challenging. First, the author defines the forest problem as it applies to the world. He then discusses the demand for forest products in 1975. Other subjects cover the half-promise of technology, trends in silviculture, management and forest genetics; also cultural promises and blocks. The author of this chapter points out that even though the forest area is shrinking, the accessible area remaining is large enough to provide all mankind with wood for the near future provided, however, that all known management and development skills are properly used.

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There is one weakness in the book: It does not contain any detailed statistics from the U.S.S.R. and its satellites. Other than this, *A World Geography of Forest Resources* will provide useful information for students of forestry, conservation, geography and forest policy makers.

FARM TROUBLE. By Lauren Soth. *Princeton University Press, Princeton, New Jersey. 221 pages, 14 figures. 1957. $3.75.*

To reduce the complicated problem of agriculture in all its ramifications to the confines of a 221-page book represents quite a feat. But the author, a Pulitzer prize winner, and a member of the editorial staff of the *Des Moines Register and Tribune*, has succeeded admirably in getting down to the essentials and presenting them in readily-understandable terms. Among the headings for the 16 short chapters are: The shibboleths; a sick industry; all kinds of farms and farmers; the neglected one-third; the surplus problem; too many farmers; price supports; ever-normal granary; the soil, and what is ahead.

In the first chapter the question is raised as to why "agricultural policy figures so importantly in the American political scene today when farm people have dwindled in numbers to only about 13 percent of the population and are still declining." It should be kept in mind in this connection that industry has taken over many of the jobs farmers used to have, giving them much more time to devote to the business of producing. An estimated 25 per cent of our people are engaged in working for the farmer, manufacturing machinery and chemicals for him, and taking over the task of processing and marketing his produce.

The author appears to have much more concern about the "neglected one-third" of the farmers whose total sales average less than $1,200 a year than he is about those on whom we depend primarily for the good things we have to eat. These marginal farmers constitute a very troublesome problem, but they are not the primary problem of agriculture. The important thing is to keep highly capable farmers in the business of farming by enabling them to have an income commensurate with their abilities as producers. We cannot afford to degrade our farmers to peasantry. We must be able to look forward with confidence to having an educated business-farmer class of men who can be depended on to keep us permanently supplied with an abundance of quality farm-produce.

Nevertheless, this book constitutes an excellent primer as a starting point in acquiring an understanding of the many problems with which both the producers and con-

Books for the Conservationist

America's Natural Resources

Edited by a Committee Headed by
Charles H. Callison,
National Wildlife Federation

Edited for the National Resources Council of America, this authoritative new book gives a clear, intelligible summary of the facts about America's natural resources and their conservation. It brings together essential information concerning soil, water, grasslands, forests, and all other major renewable resources. Each resource is covered by an expert who sketches its historical background, points out its importance to human life, shows the dangers threatening it, and explains sound methods for preserving and using it most profitably over the years. *211 pp.* **$3.75**

The Flood Control Controversy

Luna B. Leopold, *U. S. Geological Survey*
Thomas Maddock, Jr.,
U. S. Bureau of Reclamation

This thought-provoking Conservation Foundation Study clarifies both the technical problems and the economic and political issues in flood control. Explains the nature of river floods and the types of control measures possible. Book evaluates the upstream and downstream programs advocated by different federal agencies and offers an unbiased assessment of present control measures. There is a clear presentation of some often overlooked hydrologic considerations. *"The most important book yet in flood control."*—JOURNAL OF SOIL AND WATER CONSERVATION. *31 ills., tables; 278 pp.* **$5**

Vegetation and Watershed Management

E. A. Colman, *U. S. Forest Service*

This significant book provides the first systematic appraisal of the methods of managing vegetation in watersheds to increase ground water supplies, check soil erosion and siltation in reservoirs, and reduce flood peaks. It describes the effect of vegetation on the hydrologic processes of interception, infiltration, drainage and storage, surface runoff, etc., and analyzes in detail all significant research. *"A distinctive contribution to the field of watershed management."*—JOURNAL OF RANGE MANAGEMENT. *A Conservation Foundation Study. 24 ills., 6 maps; 412 pp.* **$7**

Conservation Education in American Colleges

Charles E. Lively, *University of Missouri*
Jack J. Preiss, *Michigan State University*

A unique book that records the findings of the first nation-wide investigation of conservation teaching in colleges and universities. Offers a concise review of the historical development of conservation education in the United States with a detailed exposition of the survey's objectives, methods, and important findings. The overall situation is summarized and the authors make perceptive recommendations for increasing the number of institutions teaching conservation courses and improving the training of teachers of conservation. *85 ills., tables; 320 pp.* **$5**

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sumers of agricultural commodities will be faced during the years of rapidly increasing population that lie immediately ahead of us.

—FIRMAN E. BEAR, *New Brunswick, N. J.*

ON THE WATER FRONT. By LEAGUE OF WOMEN VOTERS. *1026 17th Street, N.W., Washington, D. C. 20 pages, 1957. 25 cents.*

On the Water Front, a 20-page pamphlet issued by the Legaue of Women Voters of the United States, serves as a brief and lucid introduction to the various phases of the water problem—a subject that has been called the number one domestic problem in the United States.

The League study covers both water resources and the various government agencies which manage, conserve and develop them. Also touched upon is the interrelationship of federal, state and local agencies and short descriptions of some of the programs that are set up on a "partnership" basis. The problems of coordination between agencies are also discussed.

In taking a look at the broad scope of national interest in the subject of water, the pamphlet devotes one chapter to "Too Much Water—The Flood Problem"; another to "Too Little Water—The Irrigation Problem" and a third to "Clean Water—The Pollution Problem."

Mrs. John G. Lee, national president of the League, points out in issuing the pamphlet that "There is no simple formula to resolve the problems of conservation and development of our water resources. . . . but there is a need for some one to bridge the gap between the experts, the special interest groups and the voters if progress in solving our water problem is to be achieved. The first step is to get the problem stated in all of its ramifications and with no preconceived point of view. This we believe *On the Water Front* does."

Water Tables and Charts. *Snow Gates and Valves, Inc., 2437 East 24th Street, Los Angeles 54, California.*

A small, pocket-size booklet entitled *Water Tables and Charts* is available on request from the address above.

It contains water tables, conversion charts and much other information regarding water for irrigation. The booklet was prepared especially for engineers and contractors, but any soil conservationist working with irrigation may find it of value.

Princeton University Press presents a book that could change the direction of our entire farm policy

Farm Trouble BY LAUREN SOTH

Pulitzer-Prize winning editor, *Des Moines Register & Tribune*

This is a down-to-earth inquiry into what the author calls "America's national cancer" —that after 25 years of trial and error experience with acreage controls and price supports, one out of every three farmers still lives in poverty. In *Farm Trouble,* Lauren Soth takes a new, hard look at the problems of agriculture in a prospering industrial economy. With an acute understanding of the human, economic, and soil conservation issues involved, he criticizes the inadequacy of government policies of the last 25 years and makes his own proposals for policy changes. One of Mr. Soth's major proposals is that "subsidies for genuine soil conservation be increased to replace parity-fixing crop loans and government purchases." This proposal is made in a chapter entitled "The Soil," which will be of particular interest. "Well written, comprehensive, and very informative." *Harper's Magazine.*

228 *pages.* $3.75

To order your copy, write to: **Executive Secretary**
Soil Conservation Society of America
838 Fifth Avenue, Des Moines, Iowa

Field Notes

Felix Summers Honored

Felix Summers, contributing artist, JOURNAL OF SOIL AND WATER CONSERVATION, has been recognized by the Soil Conservation Service for his efforts *"far beyond the requirements of the technical illustration work for which he is primarily responsible."*

Summers will receive $1,000, largest amount ever granted by S.C.S. for such recognition. He is an illustrator for the S.C.S. cartographic office at Milwaukee, Wisconsin. At one time Summers was a conservation aide in Mills County Soil Conservation District in western Iowa.

The *Milwaukee Journal* of June 16 carried a special feature about Summers and "An Artist's Soil Crusade."

For the past two years a series of Summers' cartoons featuring conversation between two crows has appeared in the JOURNAL OF SOIL AND WATER CONSERVATION. Because of the requests from soil conservation districts they have been made available in mat form—12 such cartoons may be purchased from the national office.

His latest cartoon offering to the *Society* is on this page. Summers also designed the Society's national emblem in the contest held in 1952. His drawing won over 54 entries.

(Editor's Note: *Felix donates his services to SCSA and we are pleased to see him recognized.*)

Austin L. Patrick, former SCSA president, congratulates Felix Summers on receipt of his citation and check for the extra effort and quality he puts into his work.

"Big 'butter and egg men' now that they are doing business with conservation farming."

New Ranch and Range Management At the University of Nebraska

A "Ranch and Range Management" curriculum will appear in the 1957-58 bulletin of the College of Agriculture at the University of Nebraska for the first time. This curriculum allows two options, one of ranch management for those students planning to operate a ranch and a more technical one for those students planning to qualify as Range Conservationists under Civil Service.

The Sandhills area of Nebraska is devoted almost entirely to grazing, and it is very productive as a range area. Full utilization of the potentialities of the Sandhills and those of other range and pasture lands in the state requires more scientific management than is presently applied. The ranch curriculum will give young men from this area training aimed quite directly at the range problems of Nebraska.

New courses in range economics and range plants have been developed for this curriculum. Other courses in agronomy, animal husbandry, and supporting sciences offered in the University will supply basic information applicable to this field.

Demand far exceeds the supply of specialists in range management. The addition of this curriculum will help serve as a source of supply for Nebraska's needs and perhaps some of the needs in neighboring states as well.

—DONALD G. HANWAY, *Lincoln, Nebraska.*

New Water Laws For Arkansas

Conservation of water rated top consideration when two acts were passed by the Arkansas General Assembly earlier this year.

The consideration was well founded. Some 77 million acre-feet of water—enough to cover the state two feet deep—flows unused each year out of the state's many rivers. Water use has increased to a point where much of the 48.6 inches of annual rainfall must be held in reservoirs to supply needs when rainfall is lowest. In fact, Arkansas is using some 65 times as much water as in 1900 and growth of use continues.

Agriculture, industry, municipalities and recreation represent the four major uses of surface water. Of these, agriculture takes the greatest amount. Estimated use in 1954 was 447 billion gallons for agriculture compared with 30 billion for industry and 27 billion for domestic uses. Recreation, of course, is largely a non-consumptive use.

This need for water conservation led the General Assembly, in 1955, to pass Act 250 creating an 11-member Water Study Commission. This commission was charged with the responsibility of (1) making a study of the proper use and management of the surface waters of Arkansas, and (2) reporting its findings, with recommendations, to the 1957 General Assembly.

The procedure involved 10 fact-finding committees, an educational committee and a legislative drafting committee. There were involved 39 state-wide agencies and organizations which appointed some 75 members to make a contribution on some phase of the water situation. An additional 1,500 people assisted at the county level in gathering facts on local water inventories, needs and problems.

Following the collection of the water data available in Arkansas, the educational committee scheduled nine meetings throughout the state. The public was encouraged to study the Commission's report and express opinions as to the kind of legislation needed.

The legislative drafting committee studied the suggestions of the people, together with the facts assembled by the study, and prepared for the General Assembly in January, 1957, a water conservation bill. This bill, which created a Water Conservation Commission, was passed in February, 1957, and is now Act 81.

The Commission is required to issue a permit to any person for the purpose of constructing a dam on any non-navigable stream to impound water for any use. This person shall have exclusive right to this water. However, there shall be discharged each day a quantity of water necessary to preserve the flow of the stream as would normally flow.

The Act gives any person the right to acquire title and use of water stored in a Government reservoir, provided a contract can be made for such water.

During shortages of water, the Commission may allocate water from a stream among persons affected by the shortage. Preference shall be given to users for (1) sustaining life, (2) maintaining health, and (3) increasing wealth.

The Commission is authorized to gather and compile information as to the use of surface water in the state, and any other study it deems beneficial.

The General Assembly also passed Act 114 permitting a regional water distributing district to organize. This public nonprofit district may negotiate for water stored in reservoirs created by the construction of multi-purpose dams by or under the supervision of the U. S. Corps of Engineers. The purpose may be to distribute, purify, treat, or process such water for use to any group or consumer.

The operations of the district shall be financed by revenue bonds. The Water Conservation Commission shall institute an investigation of the proposed district approving the territory, purpose of its operation, and any other item that the Commission deems fitting.

While preparing these two Acts, the drafting committee recognized the rights of all persons equitably and reasonably interested in the distribution of surface water. The Common Law or Riparian doctrine was not disturbed. Statutes already on the books of Arkansas covered the authority for (1) a municipality to dam a stream to impound water for municipal use (2) a corporation to organize and supply water to the public for irrigation (3) a power company to construct a dam to generate power, and (4) the Geological and Conservation Commission to construct and maintain dams for flood control. Each of these laws gives the right of eminent domain. Under the Constitution, the Arkansas Game and Fish Commission is given the right to construct dams on streams with the power of condemnation.

These acts will not solve all of Arkansas' water problems, but the people believe there is now a sound legislative framework upon which to add sound water policies relating to the proper use and management of its surface water resources.

—GEORGE F. METZLER, *Little Rock, Arkansas*

News Notes

PRESIDENT'S COLUMN

The big event this year for the *Society* is the convention in California, August 28 to 31.

This is true for all members even though a comparatively small number can be present. We hope as many as possible will attend because it represents the high point of the year's activities.

The theme of water for 1957 seems to have been a fortunate choice because seldom within a span of 12 months have we witnessed the disastrous effect on land and on people from lack of water as experienced last season in the southwest and parts of the midwest, and then the disaster in some of the same area from too much water.

It helps drive home the need for control and conservation and how essential it is for true soil conservation and the beneficial use of the soil, both now and in the future.

Reports from the southwest indicate that soil and water conservation has proven its value, and that terraces, upstream dams and reservoirs have helped to avert much of the damage to soil and land.

But those who attend the convention will hear more about water and especially how important it is to the western states.

We are particularly gratified that Assistant Secretary of Agriculture E. L. Peterson is to be a headline speaker. He knows the problems of conservation of soil and water, protection, and wise use of our resources, both from the standpoint of the west and the North American Continent as a whole.

It's a good program that Herb Fletcher and his associates have put together.

But the program at Asilomar and the convention has a significance also for those who cannot attend in person.

Out of the papers presented, the reports given and the policies decided upon, will come a pattern of procedure and guidance for *Society* objectives. The membership will be able to share through the JOURNAL, for instance, in the highlights which set the professional standards for an organization devoted to soil and water conservation, to advance the art and science of good land use.

I am confident that the reports on membership, chapter activities, and finances will show that 1957 is a year of progress. Stability and growth in an organization are important, although not an end in themselves, and so Harold Rhodes, Wayne Pritchard, and Frank Edminster may be able to point with pride to the high membership, financial solvency, etc., but the real payoff is how well we are carrying out our responsibilities as members of a society with the objectives of devotion to conservation and intelligent use of renewable natural resources.

It's what we do as individuals and in our chapter programs and activities that counts.

Harold Rhodes thinks that we could cut down the list of delinquents if we could convince these folks that we do have a dynamic, progressive society with high professional ideals and standards. If you agree with me that we do have such, then won't you tell some of these delinquents and also non-members who should belong? And one other thing, won't you write to Wayne Pritchard or to me as to what you like, or don't like, about the JOURNAL?

It's pretty important in our *Society* setup, and I'd like to know what the members think about it; what they'd like to see in it. We can't please everyone, but I would appreciate your comments.

Now the convention is a highlight of the year for the *Society* but it isn't the end.

We'll be hearing at Asilomar about new officers and probably some new program activities for 1958. But we've plenty of unfinished business for the remainder of 1957. This applies to officers, committee members, chapter activities, and programs.

Let's close up 1957 business in these months ahead before we shift our sights to another year. There is plenty remaining to be done.

J. S. RUSSELL, *President*

New Chapters Formed

Recent new chapters include the Southeastern Oklahoma chapter embracing the counties of Choctaw, Atoka, Pushmataha, and McCurtain.

Roy A. Craft of Hugo has been elected temporary chairman of the new Oklahoma group.

Vern R. Nelson, Shelton, Washington, has been elected temporary chairman of the new Olympic View Chapter covering the counties of Grays Harbor, Thurston, Mason and Skagit, Whatcom, Kitsap, Jefferson, Pierce and Snohomish, in that state.

GO WEST WITH THE REST

S·C·S·A ANNUAL MEETING AUGUST 28-31

New Chairman for Florida Chapter

L. M. Hollingsworth, Gainesville, right, is shown handing the gavel and Florida Chapter leadership to H. A. Matthews, Tallahassee. Hollingsworth is Executive Secretary of the Florida State Soil Conservation Committee while Matthews is Area Conservationist for the Soil Conservation Service. The election took place during the two day chapter meeting in Gainesville, June 14, 15, 1957.

Ladies Active in Society Affairs

Several members of the fair sex are actively participating in *Society* affairs. Mrs. Mary Sneed of Jackson, Mississippi, serves as secretary of the Mississippi Chapter; Mrs. Helen K. Lilley, Bel Air, Maryland, as secretary of the Old Line Chapter; and Gladys Donaldson, in a similar position with the South Alabama Chapter.

Alice A. Williams is serving as secretary of the University of Michigan Student Chapter. Mrs. Iva Van Pelt is secretary of the Empire State Chapter in New York.

Until her recent resignation, Mrs. Juanita Doerr served as secretary of the Washington, D. C. Chapter.

Ruth Hine, active in the Wisconsin Chapter at the time of the 1955 national meeting in that state, is secretary of the Wisconsin Chapter.

Did we miss anyone?

West Virginia Chapter Plans Exhibit

Live grass and tree exhibits at the West Virginia State Fairgrounds, Lewisburg, and the new State FFA Camp, Ripley, are being set up now as a demonstrational project of the West Virginia Chapter, Soil Conservation Society of America.

George Sharpe of Morgantown, Extension Soil Conservationist, and E. V. Wickline of Lewisburg, chapter secretary-treasurer, reported at a recent meeting of the chapter's executive council that the neces-

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sary contacts had been made, the series of plots laid out and that some of the trees had been planted. The grasses are recommended for meadow and pasture planting in the state. Various details still are being worked out and signs will be erected.

Progress in planning the annual chapter meeting at Jackson's Mill on September 27, 28 and 29 was outlined by Roy E. Hamilton of Moorefield, program chairman. L. L. Males of Cheyenne, Oklahoma, an authority on watershed promotion, will be the banquet speaker.

Other speakers will include Carl B. Bender of New York City, representing Sperry Corp., on "Grassland Farming in the British Empire"; Lloyd Harrold of Coshocton, Ohio, making a second presentation at a chapter meeting on water runoff and general water research; T. R. Samsell of Charleston on "The Present and Future Status of Wildlife Resources in West Virginia"; Prof. Marlyn E. Lugar of Morgantown on water rights, and others.

The 17 council members attending, the largest number at any Council meeting in the 11-year history of the Chapter, heard Membership Chairman Berma Yerkey of Keyser say that 191 members are paid up now toward the goal of 225 for the year. Another *Chapter Chats* shortly will carry a letter from Frank W. Glover of Morgantown, chapter president, urging chapter members to get more members through the Club 5 program.

Chapter area activities either held or planned in six of the seven areas were discussed by the following area chairmen: Don Robey of Romney, Harry Summers of Grafton, Noel P. Cochran of New Martinsville, William Curry of Summersville, Denver Yoho of Hamlin, and members from the other two areas.

Others attending were Floyd F. Rothlisberger of Beckley, chapter vice president; Harold M. Rhodes of Morgantown, national membership chairman; John W. Pew and Glendon P. Burton of Parkersburg; J. P. Kuykendall, Morgantown; John Grant of Fairmont; and Boyd J. Patton of Morgantown.

—JOHN GRANT, *Fairmont, West Virginia*

"Club Five" Members Listed By Three Chapters

The program to recognize individuals who put forth extra effort to increase *Society* membership has been completed by three chapters for the current year.

Warner Christeson, chairman of the Red River Valley Chapter, announced that nine chapter members had secured five or more new members to qualify for *Society* emblem buttons. The men were: Curtis Loucks, Andrew Crosby, James Peterson, Warner Christeson, Floyd Yardey, Harry P. Mach, Arnold Kaufman, Kenneth Larson, and Martin Lund. Harry P. Mach received the gold emblem for enrolling the greatest number.

The Florida Chapter announced that L. M. Hollingsworth, William Hunter and John Herbert qualified for "Club Five."

In New Mexico the Rio Grande Chapter announced that Tommy Yager and F. David Bartlett had enrolled six new members.

Special recognition of "Club Five" members attending the California meeting has been planned and chapters should notify the national office of the names of such individuals prior to that time if possible.

Over 300 New Members Since Last Report

Two additional states have exceeded their 1957 membership quota—Kansas and Mississippi. Georgia, Indiana, North Carolina, North Dakota, Washington, and Wyoming continue to gain. In addition foreign membership has reached the goal established by the national membership committee with 100 foreign members enrolled for 1957 as new members.

The record for each state follows:

	1957 Quota	Enrolled to July 1, 1957	Over or Under Quota
Alabama	30	22	— 8
Arizona	25	3	—22

Arkansas	100	5	−95
California	100	62	−38
Colorado	50	13	−37
Connecticut	10	6	− 4
Delaware	10	2	− 8
Florida	50	31	−19
Georgia	25	81	+56
Idaho	40	6	−34
Illinois	60	20	−40
Indiana	25	58	+33
Iowa	70	65	− 5
Kansas	50	51	+ 1
Kentucky	60	20	−40
Louisiana	25	7	−18
Maine	10	0	−10
Maryland	50	16	−34
Massachusetts	10	5	− 5
Michigan	70	56	−14
Minnesota	40	23	−17
Mississippi	60	73	+13
Missouri	40	10	−30
Montana	25	4	−21
Nebraska	50	21	−29
Nevada	10	6	− 4
New Hampshire	10	0	−10
New Jersey	30	12	−18
New Mexico	25	17	− 8
New York	50	6	−44
North Carolina	70	85	−15
North Dakota	50	73	+23
Ohio	50	20	−30
Oklahoma	80	42	−38
Oregon	20	5	−15
Pennsylvania	30	13	−17
Rhode Island	10	2	− 8
South Carolina	50	17	−33
South Dakota	70	46	−24
Tennessee	50	16	−34
Texas	50	8	−42
Utah	20	4	−16
Vermont	10	3	− 7
Virginia	25	17	− 8
Washington	30	67	+37
West Virginia	50	24	−26
Wisconsin	50	24	−26
Wyoming	10	39	+29
Puerto Rico	10	1	− 9
District of Columbia	30	5	−25
Canada	30	16	−14
Foreign	100	100	—
Miscellaneous	85	26	−59
Total	2,200	1,354	

Inland Empire Chapter Holds Dinner Meeting

In connection with the Plant Materials Training Conference the Inland Empire Chapter held a dinner meeting June 11 at which 40 members were present. Ray Kent of Spokane, chapter president, presided. Jim Setters of Winona is vice president.

Verle Kaiser, Chairman of the Membership Committee, reported that 61 new members had been received in 1957. Washington is in fourth place in the current membership drive.

Harley Jacquot is Chairman of the Awards Committee; Wes Spencer of the Projects Committee; Jim Setters, Exhibit Committee; and James Rabdau, Publicity Committee.

Special visitors were W. A. Rockie and P. C. McGrew of Spokane; Dr. A. L. Hafenrichter and R. L. Brown of Portland, Oregon; Wes Cornwall, Mr. Wrage and Dick Ellis of the State Soil Conservation Committee.

Fay Givans, U. S. Indian Service, Lapwai, Idaho, received an Inland Empire chapter award for his work in getting conservation into the leases and onto the land operated by the Indian Service. He said, "Farmers are the only people who can put conservation on the land. I am much impressed by what we have not yet done." Plans were made for exhibits and representation at the National Soil Conservation Society meeting in California, August 28 to 31, 1957.

—R. L. KENT, *Spokane, Washington*

Colman Memorial Fund Accepted by University of California

The Edward A. Colman Memorial Fund has been accepted by the University of California. The Regents of the University have established the Colman Watershed Fellowship Fund to help train graduate students in watershed management.

The fund, which will permit training of much-needed workers, was established in memory of Edward A. Colman. After his graduation from the University of California, Colman devoted his life to the study of watershed management problems. Prior to his death in March 1956, he was chief of the Division of Watershed Management Research in the California Forest and Range Experiment Station of the Forest Service, USDA, with headquarters in Berkeley, California.

Colman was well known to *Society* members and served on the *Society's* watershed management committee. Until the fund was accepted by the University of California, Clark H. Gleason, *Society* member, served as chairman of the board of sponsors. He reported $3,282.50 had been received from 125 donors as of March 18, 1957. It is the aim of the endowment to eventually yield a stipend of $2,000 a year.

Contributions to the fund should now be made payable to the Regents of the University of California and addressed to the Coleman Watershed Fellowship Fund, School of Forestry, 243 Walter Mulford Hall, University of California, Berkeley 4, California.

CHAPTER NEWS

Oklahoma: The seven chapters of the Society in Oklahoma have formed a council and are sponsoring a state-wide meeting in Oklahoma City, September 27 and 28. A complete program will be mailed to all Oklahoma members but others are welcome to attend according to Harry Chambers, chairman of the Oklahoma council. The meeting will center around problems of water management, including watershed development, water policy, irrigation, flood control, municipal water supplies, etc.

The chapters in Oklahoma have joined with the State Soil Conservation Board and the Oklahoma Soil and Water Conservation Districts to hold a soil and water conservation contest for county agents and vocational agriculture teachers. Engraved plaques will be presented to the county agent and the vocational agriculture teacher doing the best job of conservation education. Soil district boards may nominate candidates.

Wyoming: H. Leo Wilson, chairman of the Wyoming Chapters of SCSA, has announced that the chapter has been divided into five areas with a committee in each area. Chairmen of the area committees include: John Long, Gillette, Northeast; Thomas G. Dudley, Torrington, Southeast; George M. Danielson, Lovell, Northwest; Albert L. Demorest, Jackson, Southwest; Leroy H. Rasmussen, Lander, Central.

W. G. Glover, of Cheyenne, has been named chairman of the program committee while Harlan N. Tulley, Sheridan, was named chairman of the publicity committee.

North Carolina: Chapter officers, committee chairmen arranging for the 1958 annual meeting, and the Agricultural Development Council of Asheville, met in that city on June 18. A. H. Veazey, national council member and H. Wayne Pritchard, SCSA executive secretary, were in attendance to discuss convention plans. Dates for the 1958 meeting have been set for October 19-22, 1958. C. Lindsey Hunt, Greensboro, North Carolina, is chairman of the chapter; R. C. Jordan of Elizabethtown, secretary; and Charles Patton of Asheville, has been named chairman of local arrangements for the 1958 event.

Old Line (Maryland): The annual tour was held in cooperation with a tour sponsored by Anne Arundel Soil Conservation District on Saturday, May 11. A program to discuss chapter activities followed the tour and Thomas B. Symons, Director of Public Relations, Suburban Trust Company, College Springs, was the speaker. Several members remained over night to enjoy tours the next day.

Show Me (Missouri): A meeting for members, families and friends was held at Gildhaus Church, Villa Ridge, Missouri, on Sunday, July 14. Elmer Sauer of Urbana, Illinois represented the national council. Monsignor Hildner, pastor of the Gildhaus Church, is a charter member of the Society and was made an honorary member in 1955.

Northern Illinois: The chapter issued a newsletter to the membership carrying considerable information about individual members and chapter actvities. The chapter nominated individuals for national office and council positions. The newsletter

goes to more than 150 on the current mailing list. A newsletter heading on the mimeographed sheet is purchased from national headquarters. The executive committee holds regular meetings to check on chapter committees and to develop special programs. After full consideration the chapter decided not to sponsor a student chapter at the University of Illinois but to supplement the activities of student groups in agricultural engineering, agronomy, economics, geography, and others with special conservation programs. It was decided to invite students to the annual chapter meeting.

Hoosier: Six issues of the Hoosier Chapter News have been issued and the latest number indicates they will hold a meeting at Willow Slough State Game Area, Morocco, Indiana, on July 27. The Hoosier Chapter membership at 103 is three times greater than in 1956 when they listed only 37 members.

Georgia: The first annual meeting of the chapter was held at Rock Eagle Park, May 3 and 4. Eighty-seven members and friends were in attendance.

Santa Fe Trail (Kansas): The chapter held its charter night meeting in Dodge City, Kansas, on June 14. Roger Arensdorf, chairman, called the 35 members present to order and elaborated on the opportunities to advance conservation in the Great Plains. H. Wayne Pritchard, executive secretary, presented the charter and spoke briefly to the assembled group.

Arizona: The regular quarterly meeting was held in Phoenix, April 23. Discussion centered on "Recovering Rainfall." Joe Arnold, Head, Watershed Management Division, State Land Department, served as leader. On May 16 a special meeting was held at Tucson to hear A. L. Hafenrichter tell of his attendance at the International Grassland Conference and to show pictures of "Grassland Agriculture in New Zealand."

NEWS OF MEMBERS

James T. Hegland, Work Unit Conservationist for the Soil Conservation Service at Ortonville, Minnesota, is now on a two year assignment with the Near East Foundation in Iran.

William E. Reese, Soil Scientist with the Soil Conservation Service in Ohio, is now setting up soil conservancy work in the Cauca Valley region of Colombia, South America.

Raymond A. McConnell, Jr., Editor Lincoln Journal, Lincoln, Nebraska, has resigned that position.

Mervin H. Wallace, Management Agronomist for Arizona, S.C.S., has been given an "Outstanding Performance Rating." The recognition carried with it a cash award of $300.

J. H. Satterthwaite, Tarboro, North Carolina, active in planning for the Society's 1958 annual meeting, passed away in April. He was a soil conservation district supervisor.

George B. Sheehe, Des Moines, Iowa, Assistant Secretary, Iowa Chain Store

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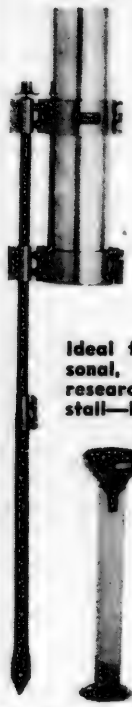

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Council, passed away in April. He was an active supporter of soil conservation and had been a *Society* member since the national office moved to Des Moines in 1952.

Adrian Fox, Washington, D. C., has been named to the 1957 conservation committee of the National Association of Biology Teachers.

Don A. Williams, Administrator, Soil Conservation Service; **Herschel Newsom**, Master, National Grange; and **Lloyd E. Partain**, Curtis Publishing Company, appeared on Georgetown University Forum's television program on April 28, discussing "Is Our Food Supply Imperiled?"

Harry Slayback, Cyril Spencer, and **Kenneth Werkman** of New Jersey S.C.S. have recently received 20-year service awards while **William O'Donnell** of the same state received a 10-year award.

Harold Heritage, formerly with S.C.S., has accepted a position in soils testing work with the Extension Service in Gloucester County, New Jersey.

Bruce Rider is now manager of equipment operations for the Salem-Cumberland Soil Conservation District in New Jersey.

George Hardman, State Conservationist for S.C.S. in Nevada has retired. **C. W. Cleary, Jr.,** is acting state conservationist.

Austin L. Patrick, Corn Belt Field Representative for S.C.S. and past-president *Soil Conservation Society of America*, has recently completed 30 years of official service.

Fred Sykes, State Conservationist in Kansas, also received a 30-year certificate from Don Williams, Administrator of the Soil Conservation Service.

Ernest Eskam, Jr., new member of the *Society* from Cimarron, Kansas, has been cited by Sheriff Thomas of the same city for "his great display of personal bravery" in helping to rescue stranded motorists during the late spring blizzard that swept the plains.

William S. Speer of the Northern Illinois Chapter has left for a two-year assignment as soil conservation advisor to the Government of India.

Homer Kuder, formerly work unit conservationist in the Will County Soil Conservation District in Illinois, has been promoted to assistant state soil conservationist in the state office of S.C.S. at Champaign, Illinois.

Robert S. McClelland, for a number of years executive secretary of the Missouri State Soil Districts Commission, has been appointed to the staff of the National Association of Soil Conservation Districts. **Harold Slusher**, formerly Callaway County Agent, has been appointed to fill the position left vacant by McClelland's appointment.

Chapters of the Soil Conservation Society of America

1. Washington, D. C.
2. Portland (Ore.)
3. South Dakota
4. Lincoln (Nebr.)
5. Salina (Kans.)
6. Bozeman (Mont.)
7. Wisconsin
8. Wm. Penn (Pa., Del.)
9. South Carolina (formerly Spartanburg)
10. Fort Worth (Tex.)
11. Rio Grande (New Mex.)
12. Inland Empire (Wash. and Idaho)
13. Empire State (N. Y.)
14. San Francisco Bay (Calif.)
16. West Virginia
18. Pocomoke (Md.)
19. Keystone (Pa.)
20. Southern New England (Conn., Mass., R. I.)
21. New Jersey
22. Northeast Oklahoma
23. El Paso County (Colo.)
24. Michigan
26. Colombia, So. America.
27. Northern Kentucky
29. Hoosier (Ind.)
31. Tennessee
32. Blue Grass (Ky.)
33. Virginia
34. Central Kentucky
35. Kentucky Lake
36. Florida
38. Mississippi
40. Southern Illinois
42. Arizona
43. Georgia
44. Licking Valley (Ky.)
45. North Carolina
46. Limestone (Ky.)
48. Green River (Ky.)
49. Iowa
50. Manhattan (Kans.)
51. Nebraska Student (Univ. of Nebr.)
52. Ontario (Canada)
53. Southern California
54. California Student (Calif. State Polytechnic College)
56. Central Oklahoma
57. Minnesota
58. Lake Cumberland (Ky.)
59. Hugh H. Bennett (Ky.)
60. West Texas
61. South Central Oklahoma
62. South Central Nebraska
63. Northern New England (Maine, N. H., Vt.)
64. Ozark Mountain (Northwest Ark.)
65. Egyptian (Southern Ill.)
66. East Georgia
67. Red River Valley (N. Dak. and Minn.)
68. Border (N. Dak.)
69. Pony Express (Northeast Kans.)
70. East Texas
71. Western Wheels (Southwestern N. Dak.)
72. Northern Illinois
73. Custer (South Central N. Dak.)
74. Univ. of Mich. Student
75. Upper Kentucky River
76. North Alabama
77. South Alabama
78. Texas A & M Student
79. Rutgers Student (N. J.)
80. Northwestern Michigan College Student
81. "Show-Me" Mo. (formerly Alfalfa-Brome)
82. West Tennessee
83. Old Line (Md.)
84. All Ohio
85. East Tennessee
86. High Plains (Kans.)
87. East Central Oklahoma
88. Big Hunt (Okla.)
89. Stillwater (Okla.)
90. Idaho
91. Southwest Oklahoma
92. Bob White (Kans.)
93. Santa Fe Trail (Kans.)
94. Bluestem Hills (Kans.)
95. Wyoming
96. Southeastern Oklahoma
97. Olympic View (Wash.)

Chapters 15, 17, 25, 28, 30, 37, 39, 41, 47, and 55 have merged with other groups to give a total of 87 active chapters.

What to See in the West

HERB BODDY

Convention-goers from east of the Rockies can see many soil and water conservation eye-openers enroute West. They'll find that good land use is taking big strides in the area from the Rockies to the blue Pacific. Good "conservation farming" can be spotted from the air lanes or key highways. Here are things to see and folks who will be glad to help you with your trip.

IN THE fast-growing, diversified West, SCSA conferees can pick and choose. Small watershed projects are swinging into action. There are strip-cropped fields, picturesque farm scenes, top-yielding rice, cotton and grainlands, lush pastures, well-run cattle spreads and pattern-like row crop acreages. Add to this the citrus fruits, and a hundred and one other products of the soil. From pomegranate trees to cranberries, it's all yours for the looking.

Water, heading from our great national forest lands, of course, is the mainspring of much of the West's good gains in agriculture. Irrigation systems—many engineered by federal agencies and some home-spun—have proved real money-makers in hundreds of farming communities.

The West is proud, too, of its dryland areas where the "dirt" farmer is king. And range and grazing lands are looking better year after year under improved management. And the giant Redwoods and Sequoias along the northern California Coast are world famed for their natural beauty.

Yes, there are plenty of conservation land-marks to see whether you travel the northern, "down-the-middle" or southern routes to Asilomar. Arid, semi-arid and heavy rainfall areas all have their talking-points and much to show SCSA members.

Well-posted conservationists, John O. Dean (Southern California), John Bradshaw (Utah), Ray Kent (Washington), Charles W. Cleary, Jr. (Nevada), and R. N. Irving (Idaho), welcome you to visit some of the farming highspots in their states.

You can see these things heading West:

UTAH

Traveling west via Highway 50 and 6, you can see the Pleasant Creek Pilot Watershed project, now completed. (Turn south at Thistle on Highway 89, travel 35 miles to Mt. Pleasant.) The project costing around $400,000 is an outstanding "team" job. See part of the 1955 mud flow that the flood works contained when only half completed. In a two-hour tour you can see debris basins, diversion and splitter dikes, special purpose terraces, revegetation, stream channel lining and irrigation structure, all part of the project. See Guy Bird, Work Unit Conservationist (WUC), City Building, Mt. Pleasant, about a tour.

At Delta on Highway 50 and 6, look for management of clay soils, border irrigation, land reclamation by drainage, beef feeding, alfalfa seed production and canal lining. Travelers entering Utah on Highways 40 and 30S via Highway 6 to Asilomar also pass near the Delta area. For local information, contact Clifford Merrill, WUC, Delta, Utah.

Pasture Management

On Highway 40 contact Work Unit offices at Heber City to see range seeding and management, and at Provo for dairy farming, irrigated pasture management and canal lining and sprinkler systems.

If you enter Utah on Highway U.S. 30S, try a side trip south on U.S. 189 to Coalville, Utah. Contact Moroni Marchant there and ask to see the Hoytsville cooperative range enterprise. It is an outstanding example of private range management.

You can proceed to Asilomar via U.S. 90 through Cedar City, Utah, Zion National Park, St. George, and Las Vegas, Nevada. It's just a short trip from Las Vegas on U. S. Highway 95 to Boulder Dam.

The St. George area has the highest concentration of concrete ditch lining of any Soil Conservation District (SCD), in Utah. See Clerin Zumwalt, WUC, St. George.

NEVADA

On Highway 40, Salt Lake to Reno, you'll pass through part of the Northeast Elko SCD which was selected in 1951 to pilot a coordinated approach to conservation and development work on public and private lands. Pilot work includes grazing management and other practices on some two million acres of range and

Herb Boddy, chairman of the annual meeting publicity committee, Berkeley, California, arranged this material for guiding your trip with the help of conservationists in other far west states.

installation of soil, crop and water management work on some 23,000 acres of irrigated lands.

Recently the SCD board reported that, after five years of conservation and development, the job is about 15 percent complete. This means that public land administering agencies and private land owners in the district have accomplished close to one million dollars worth of work in that time.

This pilot project is off to a good start with 60,000 acres of range seeded, 86 miles of fencing, 43 stock-water developments, 1,800 acres leveled, 3,000 acres of irrigation systems, and 13,000 acre feet of irrigation water storage.

Highway 93 north from Wells runs through the heart of the district. Tom Turner, WUC, Wells, will be happy to tell you more. Or, take Highway 93 north from Wells to the Hubbard Ranch, identified by a sign on the highway about 43 miles out of Wells, and let Eyer Boies, district chairman, tell you about the pilot range program.

CALIFORNIA

Stop at Beaumont on Highway 60 and contact Bob Hurlburt, WUC. He'll outline a two and a half hour tour covering dry farmed grainland treatment, controlled grade terraces or diversion systems and contour planted peach orchards with furrow and sprinkler irrigation.

On Highway 111, near Highway 60, view date farming and irrigation systems below sea level in Coachella Valley, not far from Indio and Palm Springs.

On Highway 66, near Archibald and Cucamonga are a wide variety of crops under furrow, border and sprinkler irrigation. There are citrus trees irrigated with under and over tree permanent and portable systems.

In this area, too, are several thousand acres of sandy soil in vineyards which have been mulch tilled for wind erosion control. No tillage work going on, but imple-

Cattle now graze 60,000 acres, reseeded to crested wheatgrass, where little or no forage was produced before. Northeast Elko Pilot Soil Conservation District, Nevada.

Range reseeding is a major soil Conservation practice in the Northeast Elko Pilot Soil Conservation District of Nevada. Here is a typical field of crested wheatgrass.

ments will be available and vineyards can be visited. Contact Mr. Scott, WUC, Cucamonga, for more information.

IDAHO

Look for highway seedings. U. S. Highway 93 from the Idaho-Nevada line north to Rogerson was seeded by the Twin Falls SCD. Clarence F. Hedrick, WUC, Twin Falls, knows about this. Idaho State Highway 25 from Jerome west to Bliss was seeded by North Side and Gooding SCD's. Contact H. Dale Munk, WUC, County Courthouse, Jerome, or Eugene Crisman, SCS, Gooding.

New irrigated land development and deep well pumping can be seen along U. S. Highway 30S between Malta and Burley. If you're interested in private land development in East Cassia SCD, contact Gordon J. Price, WUC, in Burley.

Newly irrigated farms between Paul and Hazelton, along State Highway 25, might prove interesting. Bureau of Reclamation project within Minidoka and North Side SCD's got cooperative assistance from Soil Conservation Service and Extension Service. For more about that see George C. Welch, WUC, Rupert.

See first farm entirely strip-cropped in Palouse area. It is 640 acres on Marion Holben's place, eight miles south of Genesee and a half mile east and off Highway 95. Work has been in about 12 years.

At Bonners Ferry on Highway 95, see diked land in Kootenai Valley where difficult flood and drainage problems exist. Contact Charles Howard, WUC, Bonners Ferry.

A good start is being made in proper timber management on the Hatcher Brothers farm, Highway 95, near Sandpoint. Contact E. O. Nurmi, WUC, Sandpoint.

WASHINGTON

Wheat farm practices can be seen on the 2,100-acre J. W. Cornwall and Sons' farm near Fairfield, 20 miles

south of Spokane on U. S. Highway 2. See how a grass-legume rotation and use of heavy stubble has stopped erosion and stepped up grain yields by over 50 percent. Garry Goodfellow in Fairfield will be happy to help you.

About 75 miles south of Spokane on Highway 195 is Pullman. Washington State College and the Palouse "bread basket." Whitman county there ranks first in the nation in bushels of wheat produced.

The Soil Conservation Service's Plant Materials Center is located on the outskirts of Pullman. The Center's 320 acres are used for observational studies, cooperative work with experiment stations and increase of improved plant materials. Some 10,000 accessions of grasses, legumes, trees and shrubs have been tested there. Contact Robert J. Olson or Norman McClure, College Station, Pullman, about a tour.

Just off the road between Pullman and Moscow, Idaho, is Gerry Hagedorn's 470-acre farm in the South Palouse SCD. He has strip cropping, a three-year rotation of sweetclover-grass-peas and grain, a water disposal system, sodded waterways and tile drainage.

West of Spokane you come to the Columbia Basin irrigation project. Visit Percy Driggs' 70-acre farm and see how more than a million acres will be brought into cultivation. The farm features a complete conservation plan, including properly designed gravity irrigation system and sound crop rotation. Contact Frank Ramey, SCS office, at Moses Lake in the Basin area.

Crossing the state to western Washington near Seattle, it is worth seeing the Army Mueller dairy farm near Auburn. The farm has been completely renovated for high production dairy farming. Here also you will be shown some problems of river channel erosion.

Another well-run farm in western Washington is the Krainich Brothers' near Enumclaw. Tile drainage on highly productive lands helps this 80-acre farm maintain a herd of 68 dairy cows. Good woodland management is also practiced.

The Del Hastings 84-acre dairy farm near Olympia, Washington's state capital, is typical of several thousand farms in southwestern Washington. Sprinkler irrigation, improved pasture mixtures and fertilization are the major practices. Call Vern Nelson or Clinton Renney, SCS office, Courthouse Annex, Olympia.

OREGON

On U. S. 20 in Oregon, you can see irrigated specialty crops at Vale and Redmond; grass seed crops at Corvallis (plus the Oregon Experiment Station) and the coastal dairy and timber country.

Highway 30 passes through excellent range; Oregon's breadbasket, with strips, curves, diversions, and other conservation work. Also see the Oregon Branch Experiment Stations at Pendleton, Hood River and Astoria.

The foreground of this photo shows the SCS plant materials center at Pullman, Washington. This is something convention-goers may wish to stop and inspect further.

Small scale increase blocks where seed supplies of new grasses and legumes are increased for further testing, SCS plant materials center, Pullman, Washington.

along with the orchard areas at The Dalles and Hood River. At Gresham, near Portland, see Oregon's concentrated vegetable and nursery area with its conservation program. Both of these east-west highways junction to the north-south arteries that lead you to or from Asilomar.

On Highway 101 you can visit two spectacular conservation projects—the Warrenton Dune SCD at the mouth of the Columbia, and the Siuslaw SCD at Florence. Both are worth a day of anyone's time. At Tillamook, center of Oregon's dairyland and site of one of the country's most modern cooperative cheese factories, good land use has really paid off.

Along Highway 99 you'll see a diversified agricultural area, and a cross-section of conservation work. Stop at SCS offices in Medford, Grants Pass, Sutherlin, Cottage Grove, Eugene, Harrisburg, Corvallis, McMinnville, Stayton, Silverton, and Mt. Angel, for local information.

Highway 97 leads through the high range and irrigated agricultural area of Central Oregon. There's excellent range management, irrigation water management, and woodland conservation at Klamath Falls, Bend, Redmond, Madras, Maupin, Dufur and The Dalles.

Now for some bragging—down Highway 395, you won't even find bigger and more wide-open spaces in Texas!

Bob Brown will be pleased to help line up your trip in Oregon. Contact him c/o Soil Conservation Service, Ross Building, 209 S.W. 5th Avenue, Portland, Oregon.

Flash!

Twelfth Annual Meeting Goes on the Air

The 12th annual meeting of the Soil Conservation Society of America will be featured on NBC's National Farm and Home Hour, Saturday, August 31. Early planning calls for interviews with some of the personalties appearing on the annual meeting program.

This participation in the National Farm and Home Hour was arranged by Herb Boddy, chairman of annual meeting publicity.

Of course, you are urged to attend the meeting. But if that's not possible, don't forget to tune in for a radio view of what's going on.

Assistant Secretary Peterson to Speak at National Meeting

Program officials have announced that Assistant Secretary of Agriculture, Erwin L. Peterson, will top the list of speakers to appear at the Society's twelfth annual meeting in California, August 28-31. Peterson will speak on Friday evening, August 30, on the subject *"The Problem of Water for the Future."* He will be introduced by Don A. Williams, Administrator, Soil Conservation Service.

Fred A. Haughton, Jr., chairman of the local arrangements committee for the 1957 annual meeting, has advised that late registrations will be accepted for the meeting on August 28-31. He urges that you promptly request the reservations you desire. Refer to the reservation form mailed to all members in early June or to the May JOURNAL OF SOIL AND WATER CONSERVATION.

You Are Invited To Attend

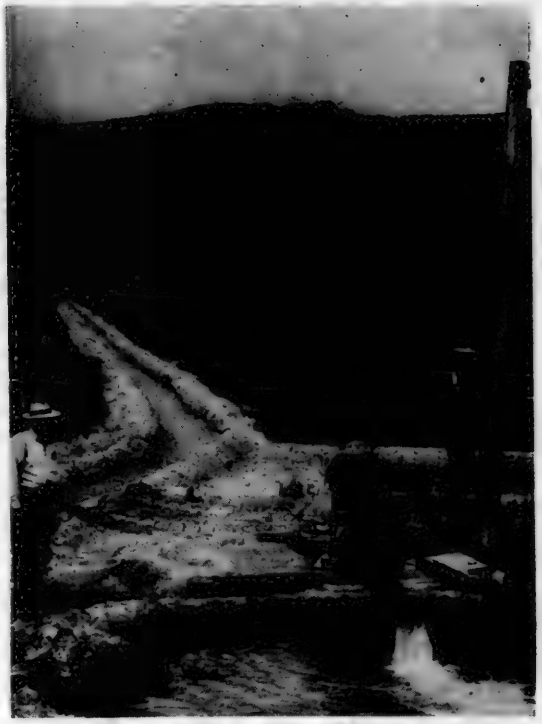
Twelfth Annual Meeting

SOIL CONSERVATION SOCIETY OF AMERICA

Asilomar Beach State Park
Pacific Grove, California

August 28-31, 1957

Make plans now to attend the annual meeting of your Society. An interesting and informative program has been arranged around the general theme of water. A field trip and barbecue are planned. Special events of interest for ladies and for families are on schedule.



Water—Precious Natural Resource.

PROGRAM

H. C. Fletcher, Agricultural Research Service, Boise, Idaho, Chairman of Program Committee.

WEDNESDAY, AUGUST 28, 1957

3:00 P.M.—REGISTRATION—Administration Building

6:00 P.M.—Dinner—Crocker Hall—Announcements

7:30 P.M.—EVENING SESSION—Merrill Hall

Presiding, Russell G. Hill, Vice President SCSA

Welcome to California—Charles M. Teague, Congressman, Monterey County, California

President's Message—J. S. Russell, President SCSA

Announcement of Chapter Awards—Herbert A. Hopper, Chairman Awards Committee SCSA

Anouncement of Journal Awards—Elmer L. Sauer, Chairman Editorial Board, Journal of Soil and Water Conservation

Panel Discussion of Chapter Activities—Ross Davies, Moderator, Chairman of Chapter Activities Committee SCSA

THURSDAY, AUGUST 29, 1957

7:30 A.M.—Breakfast—Crocker Hall—Announcements

8:00 A.M.—REGISTRATION—Administration Building

8:30 A.M.—MORNING SESSION—Merrill Hall

Presiding, Warren T. Murphy, U. S. Forest Service, Washington, D. C.

Keynote Address: "Water" The Nation's Concern Today—A Problem Tomorrow

9:15 A.M.—*Theme: Water Demands and National Economy*

Discussion Leader: E. N. Munns, Concord, California

(a) *The Increasing Water Problem For Industry and Municipalities*—Louis Warrick, U. S. Public Health Service, Washington, D. C.

(b) *Increasing Demands on Water For Agriculture*—Louis Rozzoni, President of California Farm Bureau Federation

(c) *Recreation and Wildlife Requirements For Water*—Edward P. Cliff, Assistant Chief, U. S. Forest Service, Washington, D. C.

12:00 Noon—Lunch—Crocker Hall—Announcements

1:00 P.M.—AFTERNOON SESSION—Field Trip. Irrigated Agriculture and Problems of Salinas Valley.

6:00 P.M.—*Barbecue*—Program in charge of Fred A. Haughton, Jr., Chairman of Local Arrangements Committee

(Continued on next page)

(Continued)

FRIDAY, AUGUST 30, 1957

7:30 A.M.—Breakfast—Crocker Hall—Announcements

8:30 A.M.—MORNING SESSION—Merrill Hall

Presiding, R. M. Hagen, Chairman of Irrigation Department, University of California, Davis, California

Theme: Effective Water Resource Development and Use

Discussion Leader: Wayne Kessler, State of Arizona Land Department, Phoenix, Arizona

(a) *Weather Modification: Problems and Possibilities of Increasing Supplies*—Howard T. Orville, Chairman Advisory Committee on Weather Control, Washington, D. C.

(b) *Can We Predict Our Available Water Supplies?*—Morlan W. Nelson, Snow Survey Supervisor, Soil Conservation Service, Boise, Idaho

(c) *The Water Challenge of the Southwest*—C. L. Forsling, Director Forest and Watershed Conservation Research, Charles Lathrop Pack Forestry Foundation, Albuquerque, New Mexico

(d) *Can Water Become a Non-Limiting Asset?*—Harvey Banks, Director of Water Resources, State of California, Sacramento, California

12:00 Noon—Lunch—Crocker Hall—Announcements

1:30 P.M.—AFTERNOON SESSION—Merrill Hall

Presiding, John S. Barnes, State Conservationist, Soil Conservation Service, Berkeley, California

Theme: Modern Approaches to Water Management For the Future

Discussion Leader: Charles C. Butler, Director of Land and Water Use, American Farm Bureau Federation, Washington, D. C.

(a) *Improving Public Understanding of Water Policies and Problems*—Marvin Anderson, Associate Director of Extension, Iowa State College, Ames, Iowa

(b) *Streamlining Research to Fit Expanding Water Demands*—O. J. Kelley, Soil and Water Conservation Branch, Agricultural Research Service, Beltsville, Maryland

(c) *A Coordinated Watershed Approach to Soil and Water Problems*—Nolen Fuqua, President, National Association Soil Conservation Districts, Duncan, Oklahoma

(d) *Modernizing Legislation For Sound Water Use and Development*—C. E. Busby, Soil Conservation Service, Berkeley, California

6:00 P.M.—Dinner—Crocker Hall—Announcements

7:30 P.M.—EVENING SESSION—Merrill Hall

Presiding, Don A. Williams, Administrator, Soil Conservation Service, Washington, D. C.

Master of Ceremonies and Entertainment—To be announced

The Problem of Water For the Future—Erwin L. Peterson, Assistant Secretary of Agriculture, Washington, D. C.

Presentation of Fellows and Honorary Members—Ralph H. Musser, Chairman of Committee, Washington, D. C.

Introduction of Officers for 1958—J. S. Russell, President

SATURDAY, AUGUST 31, 1957

7:30 A.M.—Breakfast—Crocker Hall—Announcements

8:30 A.M.—MORNING SESSION—Merrill Hall

Presiding, J. K. Vessey, Vice President SCSA

Progress of Technical Committees—Wallace Mitcheltree, Chairman, New Brunswick, New Jersey

Watershed Management Committee Report—Carl Brown, Chairman, Washington, D. C.

Urbanization and Non-Agricultural Uses of Agricultural Land—Karl Belser, Santa Clara Planning Commission, Santa Clara, California

Business Session—J. S. Russell, President, in charge

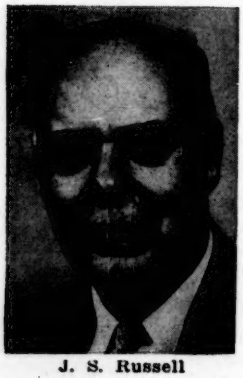
Your Society in 1957—H. Wayne Pritchard, Executive Secretary, Soil Conservation Society of America

Presentation of 1958 Convention City—C. L. Hunt and C. R. Patton, North Carolina Chapter

Reports and General Business

Closing Remarks

12:00 Noon—Lunch—Crocker Hall
Check out after lunch

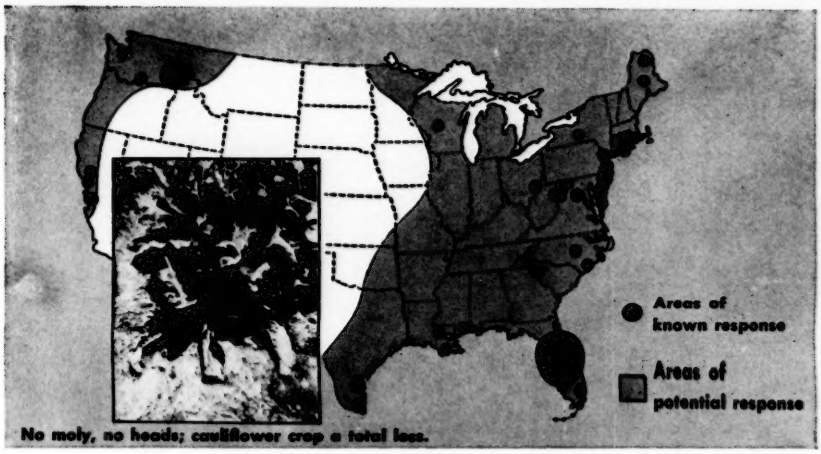


J. S. Russell

SCSA President Russell Says:

"With drouth and floods in the news, the general theme of WATER is appropriate for the Society's first West Coast meeting. Management of water—making it 'walk' instead of 'run' during periods of excessive rain and 'stretching' moisture during dry seasons—is important to agriculture. Practical suggestions along with some of the social and technical problems involved will be discussed during the Society's 12th annual meeting.

"Fred Haughton, chairman of Local Arrangements; Herb Fletcher, chairman of the Program; Herb Hopper, Western Region Council Member, and many others working with them have made extensive plans for your attendance. I hope to see you in California, August 28-30, 1957."



No moly, no heads; cauliflower crop a total loss.

Can You Spot Crops Starved for Moly?

Recognizing moly-deficiency symptoms early enough to recommend moly applications can turn withering crops into healthy stands

At a technical meeting several years ago, someone asked a speaker where responses to molybdenum applications are most likely to be found. The speaker quickly answered, "On soils near an experiment station with a staff member who's familiar with moly-deficiency symptoms and who's testing for molybdenum responses."

This remark wasn't made entirely to provoke a laugh, notwithstanding the need for a little humor at technical confabs.

What the speaker was underscoring was that we didn't then have any idea how extensive the need for moly in the United States might be. There were relatively few agricultural people who knew much about moly, especially its effects in the field. Those few who did —naturally concentrated at places such as experiment stations—found soils that needed moly because they knew what they were looking for.

Dotting the Map

Now some years later, we have expanded our knowledge of moly's role in practical farming considerably. The once few pioneers working on moly at experiment stations are now many. They and other soil scientists at universities and research institutions, as well as farmers themselves, have dotted the map (see illustration) with locations of soils requiring moly for full productivity. At least thirty crops have been shown to respond to moly applications. Of these, ten are now being grown commercially in the United States with the aid of moly.

But, although we have come a long way with moly in just a few years, many growers are still getting marginal yields, or even losing crops, because they don't recognize the symptoms of moly starvation. They can see that something is wrong, but they don't know what. They either haven't heard, or can't believe, that as little as a few ounces to a pound of moly per acre can mean the difference between skimpy, curled, twisted and scorched plants of little value and healthy crops of prime quality.

Key to Growth

Moly, while required in amounts considered minute even for a trace element, performs two essential functions in plants. It is needed for the fixation of atmospheric nitrogen by the bacteria in the root nodules of legume crops. It also is required in all crops, non-legumes as well as legumes, in the reduction of nitrates to nitrogen—the first step in protein synthesis.

Plants lacking sufficient moly show characteristic symptoms related to moly's key role in plant growth. Legumes have the well-known signs of nitrogen starvation. They are stunted, pale yellowish in color, low in protein content and hard to establish; fields are patchy. Non-legumes exhibit yellowish coloration in the leaves—chiefly in spots where nitrate accumulates between the veins and around the rim—and often the leaves are curled or cupped upwards, or otherwise distorted. Growth is poor and irregular, and the crop has an overall pale yellowish cast.

Some of these symptoms had been recognized as specific diseases—e.g., "whiptail" of cauliflower and "yellow spot" of citrus—for years before moly deficiency was discovered as the cause.

Following are more detailed descriptions of easily detected symptoms in common crops:

Beets. Plants may be stunted. Leaves narrow. Yellowing leaves make red veins stand out.

Cauliflower, broccoli. Whiptail. (See illustration.) Heads do not develop, or develop unevenly.

Cabbage. Yellowish mottling throughout leaf area between the veins. Heading prevented by twisting and cupping.

Peas. Leaves turn yellow and become somewhat transluscent. Dwarfing occurs. Vines weak and short.

Beans. Yellowish mottling sometimes called "scald". Flower and seed yield often greatly reduced.

Tomatoes. Curling and cupping of leaves. Formation of flowers and fruit reduced.

Celery. Tops turn pale green, then yellow.

Cantaloupe, cucumbers. Leaves are light green to yellow, develop edges which wither and curl. Stunting.

Differences in Soils

Crop response to moly application is often observed on soils of low pH, since under acid conditions moly is often tied up in a form unavailable to the plant. Liming, in making the soil more alkaline, releases moly to plants, and on some soils, this release of acid-bound moly may be the chief function of lime. In such cases, a few ounces of moly may be more effective and economical than several tons of lime.

Soils likely to be extremely low in moly are those that have been highly leached, such as coastal sands and hill country soils, soils that have been heavily cropped, and soils in areas of heavy rainfall. Conversely, highly productive, fertile soils, heavily limed or manured soils, and soils in regions of low rainfall are unlikely to produce visible deficiency symptoms, but increased yield and better quality may result from moly application.

In the United States, most reported responses to corrective treatment with moly are in the areas east of the Great Plains, and along the Gulf of Mexico, and in the Pacific Northwest. But until more testing is done, it is unwise to say categorically that crops grown in other areas won't respond to moly.

No Trick to Testing

Deficiency symptoms and soil types are good guides to the possible need for moly but they aren't infallible diagnostic aids. Systematic testing should always precede general application to the field.

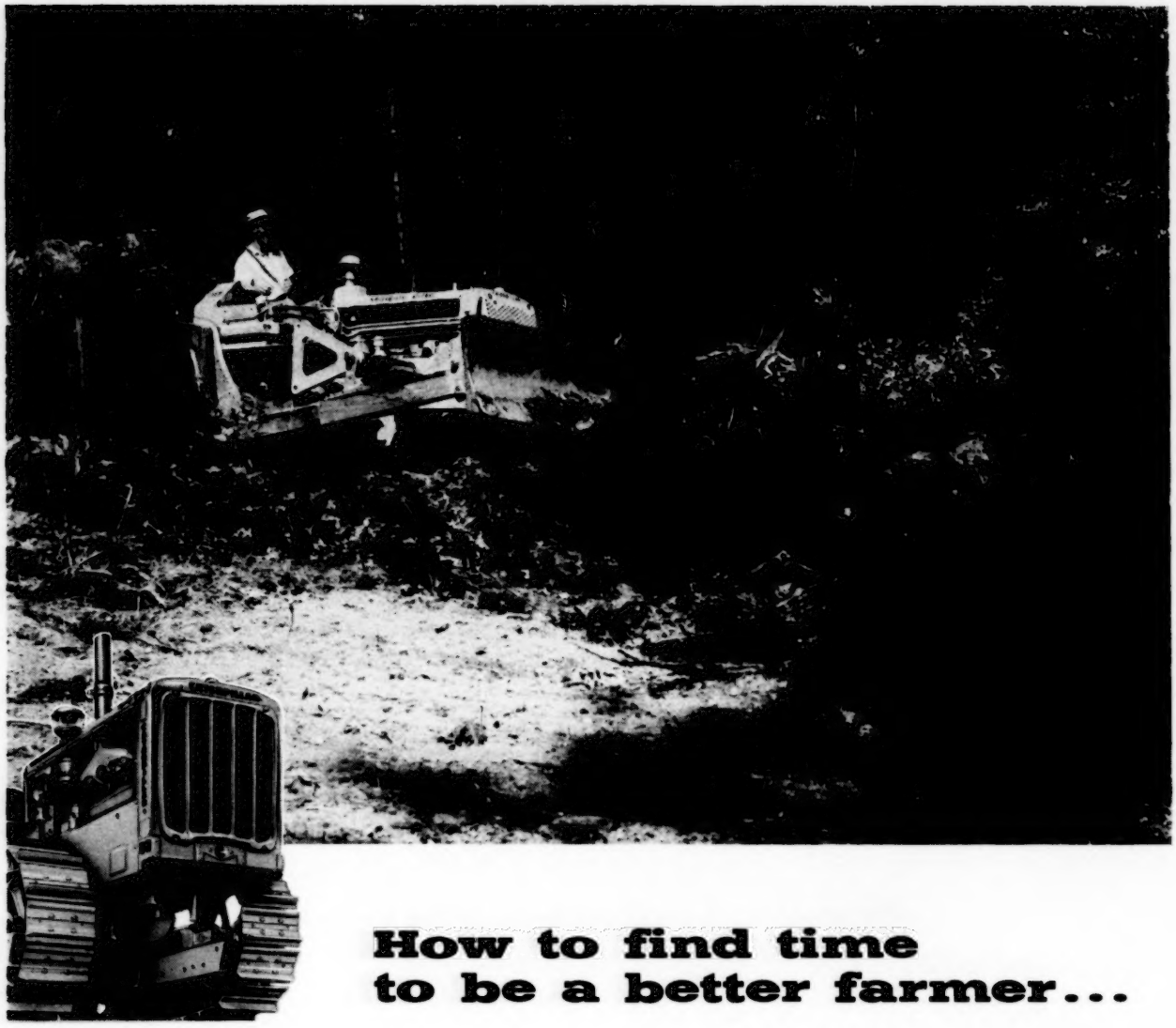
It's easy to do:

The first step is to make up a stock solution by dissolving one ounce of sodium molybdate in one gallon of water.

With vegetable crops such as cauliflower, broccoli and beets, select and mark one or more rows in the center of the field. Diluting three cups of stock solution to one gallon of water, apply the moly to the test rows, at the rate of one quart per 250 feet of row. Compare treated and untreated rows every other day.

With legumes such as alfalfa and clover, lay out a test plot 10 yards square adjacent to an untreated area to be used as a control. Follow your usual fertilizer program, but use no nitrogen on either control or test plot. Spray the test plot with one cup of stock moly solution diluted to one gallon. Applications can be made at seeding time or to an established stand. Make regular observations, comparing thickness of stand, color and quality of growth.

For a one-ounce test sample, and further information on how to lay out test plots, address Dept. 50, *Climax Molybdenum Company, 500 Fifth Avenue, New York 36, N. Y.*



How to find time to be a better farmer...

There's a world of things you can do to improve your farm when you have the time and equipment. You have *both* when you own a CAT* Diesel Tractor! Here's the power and traction you need to get onto the fields earlier, to finish up sooner, and have time left over. Here's the tractor with all-around usefulness.

Preston D. Flaherty and Son, of Hellam, Pa., find the D4 gives them that extra margin of time they need for better farming and the versatility to handle the extra jobs. As they say, "It pulls multiple tools and prepares the land with big savings in time and labor. It handles a wide variety of jobs and pays for itself doing custom work." Bob Flaherty is shown above operating their D4 on a custom job.

Now think what owning a Cat Diesel Tractor could mean to you during the slack season just ahead. With a Cat Diesel Tractor, you could add thousands of dollars of value to your farm —building ponds and roads, clearing fence rows or renovating wasteland, forming your fields for better drainage and water distribution, digging ditches, deep tillage and landscaping.

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